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GAS ABSTRACTS

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CONTENTS

1. Gas Industry 153
2. Appliances 154
3. Combustion and Industrial Furnaces 156
4. Gasification and Carbonization 158
5. Natural Gas and Natural Gas Condensates 161
6. Petroleum and Synthetic Liquid Fuels 167
7. Analytical Methods and Tests 169
8. General and Physical Chemistry 171
9. Organic Chemistry, and Petrochemicals 173
10. Chemical Engineering 174
11. Process Equipment and Instrumentation 177
12. Materials of Construction, and Corrosion 178
13. New Books 180

O. P. BRYSCH, Editor

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1. GAS INDUSTRY

Canadian Fuel

Beach, F. K. CANADIAN GAS DEVELOPMENTS. *World Petroleum 28,* 70, 71 (1957) May.

Completion of the first leg of Trans Canada and Westcoast lines is in sight. Based on large gas reserves, Canada is increasing in the production of petrochemicals and also in gas consumption. G. Kunst

EASTERN CANADA OIL AND GAS PRODUCTION SHARPLY HIGHER. *World Petroleum 28,* 116, 17 (1957) May.

Production and drilling increased sharply in Eastern Canada during 1956. Although no oil was discovered gas development was strong, particularly in the offshore area of Lake Erie. G. Kunst

MONTREAL: FIVE STEPS TO NATURAL GAS. *Gas Age 119,* 21-25, 68 (1957) April 4.

Details of the program to develop the Montreal area as a major Canadian market area for natural gas are given. E. B. Shultz

PETROLEUM AND GAS PETROCHEMICALS, *Canad. Chem. Proc. 41,* S17-S20 (1957) June.

Official statistics are discussed for Canadian petroleum and gas and petrochemicals, giving detailed statistics for production and consumption by province. Author's Abstract

Creativity

Ohmann, O. A. THE CARE AND FEEDING OF THE CREATIVE CENTER—THE INNOVATOR. *Chem. Eng. Progress 53,* 21-23 (1957) April.

Most of the great American enterprises have resulted from the economic exploitation of some technological advance. The industrial organization first developed was a means of serving or a product of centers of creativity. However as organizations grow, the resultant power centers and rigidity are natural enemies of the creative spirit. When it comes to true innovation, the record of big corporations is not impressive. Small creative centers can operate subsidized by a large corporation, wherein the administrator and innovator are contracted. The blocks to creativity presented by the large organization are reviewed. A number of methods to nourish the creative spirit are discussed. C. L. Tsaros

Engineering Unions

Knight, O. A. ORGANIZING ENGINEERS INTO UNIONS. *Chem. Eng. Progress 53,* 8, 10-12, 28, 30 (1957) April.

A discussion of engineering unions is presented. Professionals are becoming cogs in a mass production operation and should organize for collective bargaining. To get better pay from massive corporations, the greatest possible unity is needed among those who draw paychecks. Whether there should be separate organizations for labor and professionals or uniting of the two groups was not decided. C. L. Tsaros

Gas Liquids Outlook

NATURAL GASOLINE: VICTIM OF THE OCTANE RACE. *Petroleum Week 4,* 36-42 (1957) April 19.

This is a special report on the outlook for the demand of natural gas liquids. The demand for natural gasoline has been falling off as a result of the increase in octane requirements so that a substantial investment in catalytic reformers will be necessary to attain competitive octane levels. This must be coupled with precise fractionation techniques for feedstock preparation. New processes under development may permit larger utilization of natural gasoline in the future. The major development in liquefied petroleum gases is improvement of the supply-demand balance as a result of increasing pipeline movement plus the rapid development of underground storage. More pipeline transportation to northern and eastern markets is anticipated because of the greater demand of LP-gas as a fuel, as a petrochemical feedstock and as a blending component in refineries. Total pipeline movement of LP-gas last year jumped 83% to 11.7 million barrels and further major gains can be expected. H. R. Linden

Gas Price Stability

TEXAS GAS HEAD SEES FIELD PRICE

STABILITY AT ABOUT 20-CENT LEVEL. *Gas Age 119*, 33, 34 (1957) April 18.

The position and prospect of Texas Gas Transmission Corp. is briefly presented. The present natural gas reserves are about 20 times the 1956 sales. Stability of field prices at about the 20-cent level is indicated. Increases in the company's rates based on new Gulf Coast purchases should be minor after 1957. E. B. Shultz

India Resources

Thacker, M. S. INDIA'S POWER ECONOMY. *Fuel Research Inst.* (India) *News Bull. 6*, 32-48 (1956) June.

Although today the average annual energy consumption in India per head is about 100 therms or 0.47 tons coal, the development of the country's total resources has been studied intensively, and much thought given to comprehensive plans to raise the industrial capacity and the standard of living. Utilization plans, resources and consumption are presented in considerable detail from recent statistics. O. P. Brysch

Linear Programming

Charnes, A. and Cooper, W. W. LINEAR PROGRAMMING AS A TOOL FOR THE SOLUTION OF MANAGEMENT PROBLEMS. *Chem. Eng. Progress 53*, 170-73 (1957) April.

Basic principles of the application of linear programming is shown with an example using two machines to make two products. The editors suggest that this article be read as a complement to one on Operations Research, *Chem. Eng. Progress 53* (1957) January.
C. L. Tsaros

Nuclear Reactors

AEC's FAST REACTOR PROGRAM. *Nucleonics 15*, 67 (1957) April.

The Atomic Energy Commission program for fast reactors of the breeder type will investigate: 1) EBR-I (Experimental Breeder Reactor) for temperature coefficient of reactivity and resonance instability studies, 2) EBR-II (Experimental Breeder Reactor) of greater power level and advanced design, based on EBR-I results, 3) ZPR-II and ZPR-V (Zero Power Reactor) to study core design configurations, Doppler effect in temperature coefficient of reactivity, and control by slow neutrons, 4) LAMPRE-I, II, and III (Los Alamos Molten Plutonium Reactor Experiment) to determine the feasibility of employing plutonium in molten form. This type of reactor would have freedom from reprocessing and fuel element problems. Results obtained in these investigations will aid in the design of EFFBR (Enrico Fermi Fast Breeder Reactor), a 90,000 KW power reactor to be constructed near Detroit. C. G. von Fredersdorff

Petrochemicals or Pipeline Supply?

ARTHUR KROCK OF THE "TIMES" LOOKS AT TEXAS NATURAL GAS. (Editorial, New York Times). *Fueloil and Oilheat 16*, 69 (1957) June.

This editorial considers the effect of local industrial development in Texas on the consumers in other states depending on Texas natural gas transported by interstate pipelines. In an effort to sidestep FPC control of natural gas prices, large and small Texas producers are looking toward the booming petrochemical industry to use the gas presently sold to interstate pipelines. The author poses the legal question of hardship caused to northern communities dependent on this gas. J. M. Reid

2. APPLIANCES

Air Conditioning

Ligon, W. H. GAS AIR CONDITIONING. *Gas Heat 8*, 83-88 (1957) June.

The American Gas Association's Promotion, Advertising and Research Committee has taken over much of the research on summer cooling with gas in an attempt to provide a summer load that will help to balance the winter gas heating peak. PAR chairman outlines the research now being undertaken by A.G.A.
G. Kunst

INSULATION: — KEY TO EXPANDED COOLING MARKET? *Gas Heat 8*, 26 (1957) April.

Added insulation may reduce installation costs for heating-cooling units as well as cutting operating expenses. G. Kunst

Dehumidification

Ellis, W. E. DEHUMIDIFICATION BY MECHANICAL REFRIGERATION. *Heatg. Pipg.*

Air Condg. 29, 152-56 (1957) April.

Design of special refrigeration units to accomplish dehumidification is considered. Conditions are described which control when mechanical refrigeration can be applied advantageously, or rarely, to dehumidifaction problems. E. B. Shultz

Gifford, E. W. DEHUMIDIFICATION BY LIQUID SORBENTS. *Heatg. Pipg. Air Condg. 29,* 156-59 (1957) April.

Desirable characteristics of suitable liquids, and typical applications or triethylene glycol and lithium chloride are given. Advantages are described in representative applications. E. B. Shultz

Domestic Heating

Parson, D. GAS HEATING TO GROW. *Gas Heat 8,* 53-55 (1957) June.

The gas utility industry will rise even further according to estimated figures of the A.G.A. and is expected to reach 20½ million by the end of 1959. G. Kunst

Richmond, K. C. COST ACCOUNTING WITH PARTICULAR REFERENCE TO FUEL, HEATING, STEAM AND OTHER COSTS. (Heating and Fuel Service Memo. 4) *Coal-Heat 72,* 5-10, 30-35 (1957) April.

Knowledge of the overall heating and fuel performance of American buildings, for purposes of comparison of one heating period or one building with another, is not widespread, chiefly because of lack or inadequacy of cost and operating records. Examples of accounting methods for heating plants of all sizes are discussed. Manuals and uniform standards of American Hospital Assn.; National Assoc. Building Owners and Mgrs.; Building Mgrs. Assn. Chicago; Boards of Education of New York City and Detroit; Amer. Inst. of Laundering; NDHA; Post Office Dept.; Federal Power Comm.; state institutions; utilities and certain large industrial concerns are mentioned. O. P. Brysch

THE DOMESTIC HEATING SECTION OF THE FUEL RESEARCH STATION. *Coke and Gas* (British) *19,* 135-41 (1957) April.

Since 1924, the Dept. of Scientific and Research has operated a Fuel Research Station at Greenwich for study of domestic heating fuels and appliances. A review of operations and description and illustrations of testing facilities is given. O. P. Brysch

Fume Combustion

Adey, W. M. CATALYSTS IN APPLIANCES. *Appliance Mfr. 5,* 57-63 (1957) June.

Many uses for catalyst-coated wire, such as odor and smoke destruction, are described. R. T. Ellington

Refrigerator Systems

Clayton, C. C. STEAM-JET REFRIGERATION SYSTEMS. *Cost Engineering 2,* 42-48 (1957) April.

The cost of installing and operating steam jet refrigeration is discussed along with analysis of specific installations. R. T. Ellington

Lautensack, H., O'Connor, F. M. and Suval, M. L. MOLECULAR SIEVE A REFRIGERANT DESICCANT. *Refrigerating Eng. 65,* 33-36 (1957) May.

Performance of a new selective adsorbent, molecular sieves, has been investigated in the drying of some refrigerants. These materials have high water adsorption capacities, both at low concentrations in the order of 10 ppm, and at temperatures as high as 140° F. Extensive tests have shown that molecular sieves perform effectively in reducing freeze-up and corrosion in operating refrigeration systems. G. Kunst

Warm-Air Furnaces

Colborne, W. G. PERFORMANCE OF INTERMITTENTLY-FIRED OIL FURNACES. *Heatg. Pipg. Air Condg. 29,* 147-50 (1957) April.

Performance tests on warm-air furnaces are normally run under steady-rate conditions. That is, the readings and measurements are taken after temperatures and pressures have reached equilibrium. Warm-air furnaces, however, are controlled in practical applications by a thermostat, and the resulting operation is intermittent. This paper presents the results of tests on two oil-fired warm air furnaces run under various conditions of intermittent operation. It shows that the performance under intermittent firing is different from that under continuous firing and discusses the factors causing the changes in performance. Author's Abstract

3. COMBUSTION AND INDUSTRIAL FURNACES

Air Pollution

M.E.C.C.A. *Coke and Gas* (British) *19*, 142-51 (1957) April.

The Mechanical Engineers' Contribution to Clean Air Conference dealt with problems relating to air pollution by industry in a symposium of 16 papers. Information of interest to gas and coke producers is condensed herein and discussed in the light of the Clean Air Law limitations on smoke, dust and grit emissions to be enforced beginning in 1958. O. P. Brysch

Burning Rate Calculation

Coffin, D. P. and Brokaw, R. S. A GENERAL SYSTEM FOR CALCULATING BURNING RATES OF PARTICLES AND DROPS AND COMPARISON OF CALCULATED RATES FOR CARBON, BORON, MAGNESIUM, AND ISOOCTANE. Nat. Adv. Comm. for Aeronautics. Tech. Note 3929 (1957) February.

A system with general equations for computing burning rates of small particles has been devised; the effects of diffusion, heat conduction, and dissociation are included. The equations have been applied directly to carbon and boron and reduced to simpler forms used previously for isooctane and magnesium. The simpler computations appear to give sufficient accuracy for many purposes. For the combustion of boron particles, three graphs permit rapid determination of burning rate for a wide range of ambient temperature and ambient partial pressure of oxygen.

Authors' Abstract

Fenimore, C. P. and Jones, G. W. THE WATER-CATALYZED OXIDATION OF CARBON MONOXIDE BY OXYGEN AT HIGH TEMPERATURE. *J. Chem. Phys. 61*, 651-54 (1957) May.

By sampling burnt gases from lean flat hydrocarbon flames at one atmosphere pressure, the oxidation rate in the presence of ample water at 1700°-2000° K. is determined to be

$$-1/(0_2)\ (\mathrm{dln(CO)/dt}) = 1.2 \times 10^9\ \mathrm{e(exp.-24{,}000/RT(moles/1)-1)}$$ per sec.

In the burnt gas from carbon monoxide flames, containing very little water, —dln(CO)/dt is independent of oxygen and roughly proportional to water. The slower rate of comparatively dry carbon monoxide flames is raised toward the value appropriate to hydrocarbon flames by adding hydrogen to the carbon monoxide. A partial mechanism is suggested which is consistent with these results. Authors' Abstract

Combustion Reactions

Glawe, G. E. and Johnson, R. C. EXPERIMENTAL STUDY OF HEAT TRANSFER TO SMALL CYLINDERS IN A SUBSONIC, HIGH-TEMPERATURE GAS STREAM. Brokaw, R. S. and Johnson, R. C. APPENDIX C: METHOD USED TO COMPUTE VISCOSITY AND THERMAL CONDUCTIVITY OF COMBUSTION GAS MIXTURES. Nat. Adv. Comm. for Aeronautics Tech. Note 3934, (1957) May.

A Nusselt-Reynolds number relation for cylindrical thermocouple wires in crossflow was obtained from the experimental determination of time constants. Tests were conducted in exhaust gas over a temperature range of 2000° to 3400° R, a Mach number range of 0.3 to 0.8, and a static-pressure range from ⅔ to 1⅓ atmospheres, yielding a Reynolds number range of 450 to 3000. The correlation obtained is $\mathrm{Nu} = (0.428 \pm 0.003)\ \sqrt{\mathrm{Re}^*}$ with average deviations of a single observation of 8.5 percent. This relation is the same as one previously reported for room-temperature conditions.

Authors' Abstract

Weil, S. A., Ellington, R. T., Searight, E. F. and Hu, S. FUNDAMENTALS OF COMBUSTION OF GASEOUS FUELS. Institute of Gas Technology (Chicago) Research Bulletin 15 (1957) April. $5.00.

This Bulletin presents the results of an extensive search of the literature on the theory of combustion, combustion phenomena, experimental investigations of various phases of combustion, and certain fundamentals important to burner design. Of the literature published before Fall 1955, over a thousand references were consulted, and some two hundred have been critically reviewed. The more significant findings and opinions are summarized. Limitations of the present fundamental understanding of several phases of the combustion process pertinent to the gas industry are discussed: a) theories of flame propagation and the method used to test these theories; b) the

problem of combustion initiation with respect to flammability and ignition; c) aerated flames, including the process of inspiration of primary and secondary air and flame stability; and d) diffusion flames. Aspects requiring further investigation for full utilization of the combustion process are presented.

Authors' Abstract

Semenov, N. N. SOME PROBLEMS OF CHAIN REACTIONS AND THE THEORY OF COMBUSTION. *Uspekhi Khimii* (U. S. S. R.) (Progress of Chemistry) *26*, 273-91 No. 3 (1957).

An expansion of the text of the Nobel lecture delivered in Stockholm on December 11, 1956. This paper summarizes work performed over the past 20-30 years in the author's own laboratory, and surveys other literature as well on the application of chemical kinetics to the theory of combustion and explosion and the mechanism of chemical reactions, chain reactions in particular.

Associated Technical Services

Explosion Safety

Myhill, A. R. EXPLOSION RISKS IN INDUSTRY. *Chem. and Process Eng.* (British) *38*, 135-38, 44 (1957) April.

The causes of accidental explosions in industries which manufacture, store, and transport combustible gases, liquid and solids are presented with a discussion of means which can be taken to avoid or reduce the risks of explosions.

E. J. Pyrcioch

Flame Research

Bollinger, L. E., Strauss, W. A. and Edse, R. BURNING VELOCITIES OF BUNSEN BURNER FLAMES BY THE FLAME-PRESSURE METHOD. *Ind. Eng. Chem. 49*, 768-73 (1957) April.

By this method, burning velocities increased with pressure much less than those observed by other methods. It was concluded that the present theory on flame pressure is incomplete and burning velocities cannot be derived from simple flame-pressure measurements.

E. B. Shultz

Dixon-Lewis, G. and Isles, G. L. FLAMES IN MIXTURES OF METHANE AND AIR NEAR THE LOWER LIMIT OF FLAMMABILITY. *Faraday Soc. Trans.* (British) *53*, 193-98 (1957) February.

As part of an investigation of flammability limits, the burning velocities of CH_4 and air flames in the region of the lower limit have been measured on a modified flat-flame burner in which the top gauze has been replaced by an electrically-heated, perforated top plate. For a given matrix temperature, approximate straight-line relationship between burning velocity and composition is found. When the temperature level in the system rises, the lower-limit burning velocity decreases. Convection may be important in placing a lower limit on the burning velocity.

Authors' Abstract

Gas Turbines

Blaskowski, H. J. and Singer, J. G. GAS TURBINE BOILER APPLICATIONS. *Combustion 28*, 38-44 (1957) May.

The gas turbine's promise of operating flexibility has been borne out in application to power and process cycles. This paper classifies the principal methods of combining steam and process with the gas turbine and points out a number of boiler considerations.

R. T. Ellington

Stys, Z. S. GAS TURBINES FOR THE CHEMICAL INDUSTRY. *Canad. Chem. Proc. 41*, 68, 69, 72 (1957) May.

Applications of the gas turbine in compression of gaseous reactants is discussed for nitric acid plants, with a list of 14 plants.

O. P. Brysch

Heat Processing

Cooke, H. R. INDUSTRIAL APPLICATION OF AIR HEATED BY GAS. *Gas J.* (British) *290*, 130-33, 37, 38, 42 (1957) April 17; *Gas World* (British) *145* (Indust. Gas Supplm). 148, 50 (1957) June 15.

Examples of industrial applications of air heated by gas are described and illustrated. These include: 1) removal of natural moisture, 2) removal of processing moisture or liquids 3) removal of volatiles or curing 4) heating of buildings 5) treatment of foodstuffs 6) processing of metals, glass.

O. P. Brysch

Industr. Gas Develop. Comm. Gas Council. HIGH VELOCITY, HIGH TEMPERATURE

AIR HEATER. *Gas World* (British) *145*, 83 (1957) April 20.

This report relates to the design and performance of a special form of air heater which was requested by Rolls-Royce Ltd., Derby, who required a source of hot air for observation of thermo-couple behaviour in conditions similar to those obtained in jet aero engines.

Authors' Abstract

Smith, A. Q. ALFALFA PROCESSING—A QUARTER CENTURY OLD. *Ind. Gas 35*, 3-5 (1957) May.

Detailed description is presented of two different drying plants for processing alfalfa for feed. R. T. Ellington

4. GASIFICATION AND CARBONIZATION

Char Formation

Kinney, C. R., Nunn, R. C. and Walker, P. L. Jr. CARBONIZATION OF ANTHRACENE AND GRAPHITIZATION OF ANTHRACENE CARBONS. *Ind. Eng. Chem. 49*, 880-84 (1957) May.

To study the processes by which graphitizable chars and carbons are produced, anthracene chars were prepared in several different ways, calcined at temperatures up to 1000° C., and finally graphitized at about 2500° C. Calculated X-ray diffraction parameters of the carbons and graphite were used for comparing the structural changes induced by the varying conditions employed. Anthracene chars prepared at about 500° C. have interlayer spacings of 3.44 A. and well defined (002) peaks as shown by high ratios of I_v/I_p. However, biphenyl chars prepared in the same way have much higher interlayer spacings and lower I_v/I_p ratios. Because anthracene chars are highly graphitizable and biphenyl chars are not, formation of a well-ordered initial char is essential for the production of an easily graphitized carbon. Authors' Abstract

Coal Carbonization

Dryden, I. G. C. CHEMISTRY OF COAL AND ITS RELATION TO COAL CARBONIZATION. *J. Inst. Fuel* (British) *30*, 193-222 (1957) April.

Past research on chemical constitution of coal and its probable physical and molecular structure is reviewed. Coal pyrolysis and the nature of volatile matter were studied from published data on U. S. and British coals. Relationship of the ultimate components of volatile matter to the phenomena and yields of pyrolysis over a broad range of coals is treated in great detail. An 80-item list of references and eight pages of discussion are included. O. P. Brysch

Farafonow, W. M. CONTINUOUS CARBONIZATION PROCESS AND APPARATUS FOR SOLID CARBONACEOUS MATERIALS. U.S. 2,787,584 (1957) April 2.

Lump carbonaceous fuels or briquets, preheated directly by waste gases, are carried into the base of a vertical carbonizer by an eductor-flow of molten metal (Mg or Al). During devolatilization, the mixture rises along a helical baffle, and overflows into a separator vessel where the metal drains off. Coked lumps are cooled in a sealed chamber and are continuously removed by conveyor, while the metal is recycled to the carbonizer. O. P. Brysch

Lohrey, C. R. (assigned to Kaiser Steel Corp.) PRODUCTION OF METALLURGICAL COKE. U.S. 2,787,585 (1957) April 2.

Seven to 25 percent of petroleum coke is blended with western U. S. coking coals to form a carbonizing mixture which yields a high-strength metallurgical coke. Petroleum coke of 14 to 25% volatile matter (intermediate pressure-cracking coke (U.S. Pat. 1,919,157, 1933) is preferable. Small amounts of low-volatile coking coal may be substituted for the petroleum coke, (and coal-tar pitch for high-volatile coal) without affecting the quality of coke.

O. P. Brysch

Nadziakiewicz, J. THE DETERMINATION AND SIGNIFICANCE OF THE WIDTH OF THE PLASTIC LAYER IN COAL. *Coke and Gas* (British) *19*, 193-98 (1957) May.

Basic laboratory studies and results on coal plasticity are discussed, as applied by the Institute of Chemical Utilization of Coal in Poland. The plastometric method of L. Sapozhnikov, which determines the thickness of the plastic layer, is used and compared to other plasticity indexes. O. P. Brysch

Coal Gasification

Andrews, R. A. PRESSURE GASIFICATION OF BROWN COAL AT MORWELL AUSTRALIA. Instn. Gas Eng. (British) Comm. No. 503 (1957) May; *Gas World* (British) *145*, 1048-57 (1957) May 18; Ibid. 1151-54 May 25; *Gas J.* (British) *290*, 421-26 (1957) May 22; *Coke & Gas* (British) *19*, 250, 51, 59 (1957) June; *Gas Times* (British) *91* 241, 42 (1957) June 14.

The State of Victoria has substantial deposits of brown coal (44,000 million tons), but no coking or gas coals. The preliminary investigation gave complete vindication of the Lurgi process for gasification. The next step was the construction of Lurgi units to a total capacity of 30 million cf per day on the coalfield and the provision of a pipeline 103 miles long to deliver the gas to Melbourne. Operating results and a conservative estimate of cost are given (for three months only) for the two Lurgi generators in operation. Differences in combustion interchangeability make it necessary to blend the brown-coal gas with refinery gases. The Fuel and Gas Corp. of Victoria is investigating synthesis processes, whereby from the present gas of 446 Btu per cu ft, a whole new field of "synthesis" products is opened up. A semi-commercial Spuehlgas unit for production of hard, metallurgical-quality char briquets also is included. O. P. Brysch

Zielke, C. W. and Gorin, E. KINETICS OF CARBON GASIFICATION. *Ind. Eng. Chem. 49*, 396-403 (1957) May.

This article extends to temperatures of 1500° and 1700° F. experimental data on the kinetics of interaction between hydrogen-steam mixtures and low temperature char. These data and those previously reported have been integrated into a single empirical correlation which fits the mass of data collected on differential rates of char gasification. The correlation is valid over the temperature range of 1500° to 1700° F., pressure from 1 to 30 atm., and gas compositions ranging from 10% hydrogen in steam mixtures to pure hydrogen. Data are also presented on surface area and reactivity of char. The mechanism of methane formation is discussed. This information should be useful in commercial design on char gasification.

Authors' Abstract

Piha P. and Pietilaeinen, I. DIE WASSERGASREAKTIONEN IM WASSER UND IHRE BEZIEHUNGEN ZUR BILDUNG VON KOHLENWASSERSTOFFEN. (THE WATER GAS REACTIONS IN WATER AND THEIR RELATION TO THE FORMATION OF HYDROCARBONS.) *Erdoel u. Kohle* (German) *10*, 293-97 (1957) May.

Because the gasification reactions in the water phase have not received satisfactory theoretical treatment in the literature the authors review more intensively the knowledge up to date. They contribute several computations which lead them to conclude that to perform the reactions successfully a hydration reaction must occur and that amorphous carbon is necessary.

G. Kunst

Coal Pipeline

Dauber, C. A. PIPELINE TRANSPORTATION OF COAL. *Combustion 28*, 39-43 (1957) April.

This paper, describing general aspects of the 10.75 in. OD, 108-mile pipeline for transporting a slurry of 50 weight percent coal, was presented at the American Power Conference in March, 1957. R. T. Ellington

Hydrogen Recovery

Palazzo, D. F., Schreiner, W. C. and Skaperdas, G. T. LOW-TEMPERATURE RECOVERY OF HYDROGEN FROM REFINERY GASES. *Ind. Eng. Chem. 49*, 685-88 (1957) April.

A new process involving low-temperature condensation and absorption is described. Hydrogen of up to 99.9 + % purity has been obtained from gases containing as little as 65% hydrogen, impurities being light hydrocarbons, for the most part. E. B. Shultz

Iron-Coke

Barking, H. and Ehmann, C. DIE BEEINFLUSSUNG DER VERKOKUNGSEIGENSCHAFTEN VON KOHLE DURCH METALLAKTIVE FUELLSTOFFE. BEITRAG ZUR KENNTNIS DER EISENKOKSHERSTELLUNG UND ZUR BEURTEILUNG DES BACK- UND KOKUNGSVERMOEGENS HOCHBITUMINOESER KOHLEN. (THE INFLUENCE OF METALLIC FILLERS UPON THE COKING PROPERTIES OF COAL. CONTRIBUTION TO THE KNOWLEDGE

OF IRON-COKE PRODUCTION AND THE ESTIMATION OF CHARRING AND COKING PROPERTIES OF BITUMINOUS COALS.) *Brennstoff-Chemie* (German) *38*, 107-16 (1957) April 17.

The influence of active metal fillers (Fe, Co, Ni) on the analytical methods used for classification of coal is being applied to the explanation of coke-forming properties. By means of these laboratory methods of investigation and with the aid of coke microscopy it is shown that the coking ability and coking degree has a relationship with the cohesion of the plastic coal surface. The effect of fillers and metal oxides are investigated and the results show that coking qualities are improved by the addition of iron ores and mineral oils. Graphs and tables of test results, and photomicrographs of coked blends are given. G. Kunst

Oil Gasification

Ingram, L. P. AN APPROACH TO THE USE OF OIL GAS IN AN INTEGRATED SYSTEM. Instn. Gas Eng. (British) Comm. No. 506 (1957) May; *Gas World* (British) *145*, 1058-61, 81, 98 (1957) May 18; Ibid. 1160-63 May 25; *Gas J.* (British) *290*, 438-44 (1957) May 22; *Coke and Gas* (British) *19*, 244-47 (1957) June; *Gas Times* (British) *91*, 255, 56, 61 (1957) June 14.

The paper deals with the varying load problems of the South Western Area, and the planned development of the Gloucester gas works for full-scale production of a variety of gases. The Jones, Hall, Kopper-Hasche and Gaz Integral plants are described, with operating data from the first three, and plans for further extension of plant and large scale transmission are outlined. O. P. Brysch

Tuggle, G. B. and Joy, P. C. HONOLULU GAS' EXPERIENCE WITH HIGH BTU OIL GAS. *Gas 33*, 42-49 (1957) April.

The operating experience of the Honolulu Gas Co. in the manufacture of high Btu oil gas is summarized. Problems discussed include tar-handling, effect of feedstock variations on generator performance, and atomization of the feedstock. G. G. Wilson

Oxide Purifiers

Bairstow, R. OPERATION OF TOWER BOX PURIFIERS. *Gas J.* (British) *290*, 243, 46-51 (1957) May 1; *Gas World* (British) *145*, 909 (1957) May 4.

Detailed description of equipment, operating procedure and results are given of the two installations (Southall and Bow Common) of Balfour Lecoq tower-box purifiers. These are six- and five-tower plants, respectively, of 14 and 16 trays per tower, capable of purifying 7.5 and 4 million CF coal gas per day, with complete mechanical handling of iron oxide.

O. P. Brysch

Pitch Briquets

Friehmelt, E. BEOBACHTUNG DES PECHS IN STEINKOHLENBRIKETTS UNTER DEM MIKROSKOP. (THE OBSERVATION OF PITCH IN COAL BRIQUETS UNDER THE MICROSCOPE.) *Brennstoff-Chemie* (German) *38*, 97-102 (1957) April 17.

The polished surface of a coal briquet shows adsorbed color layers, formed by certain immersion oils, and visible under the microscope. Since these tempering colors are formed only on pitch, this can be identified in this manner. With an improved polishing and imbedding technique the observed pitch was made visible quantitatively enabling a closer control of the variables in the briquetting process.

G. Kunst

Reformed Gas

NEW FRENCH PROCESS FOR REFORMING L.P.G. IS LAUNCHED BY AMERICAN FIRM. *Gas J.* (British) *290*, 126, 42 (1957) April 17; *Gas World* (British) *145*, 801, 02 (1957) April 20; *Chem. Eng. 64*, 152-56 (1957) April.

Gas Machinery Co. of Cleveland, Ohio, will introduce to the U. S. the new MS-17 Micro-Simplex reforming process, invented by P. Gross and licensed by Stein & Roubaix of Paris. Designed for LP-gas or refinery-gas reforming on a nickel catalyst, this is an automatic, four-step cyclic process of great flexibility.

W. G. Bair

Synthesis Gas

Eastman, D. B. and Gaucher, L. P. (assigned to The Texas Co.) MANUFACTURE OF SYNTHESIS GAS. U.S. 2,789,094 (1957) April 16.

A process for manufacturing a synthesis gas containing carbon monoxide, hydrogen, and nitrogen which has particular application to the synthesis of ammonia. The process involves

the use of a "flow generator," a reaction chamber wherein gaseous hydrocarbons and excess air (above that required for complete conversion of all carbon to carbon monoxide) are reacted at high temperature. The gas formed is mixed with gas produced by steam reforming to provide the proper nitrogen/hyrogen ratio for ammonia synthesis. An alternate procedure involves feeding the effluent from a steam-reforming step to the flow generator.
H. L. Feldkirchner

Markert, F. and Kittel, E. (assigned to Badische Anilin- und Soda-Fabrik A.G.) PRODUCTION OF GAS. U. S. 2,792,293 (1957) May 14.
This process uses circulating liquid and vapor mercury for the transfer of sensible heat from hot synthesis gases produced by gasification of carbonaceous solids to the gasifying oxygen and steam mediums. E. J. Pyrcioch

5. NATURAL GAS AND NATURAL GAS CONDENSATES

Communications

Judah, M. A. 1000 MILES OF MICROWAVE TESTED FROM DESK CONSOLE. *Pipe Line Ind. 6,* 38-40, (1957) April.

Platte Pipeline Co's. communications technicians have consolidated all circuits needed to test out equipment at 45 microwave stations atop a standard office desk. Daily inspections are now easier and quicker. Author's Abstract

COMMUNICATIONS LEADERS MEET IN HOUSTON. *Pipe Line Ind. 6,* 35, (1957) April.

Here is a "thumbnail" report of a high-interest program planned for the 29th Annual Meeting of the PHEA and PESA in Houston this month. Latest developments in electronic equipment, power plants, plus communication techniques and regulation fill the four-day conclave.
Author's Abstract

VHF CONTROLS SARAWAK SEA-LOADING OPERATIONS. *Pipe Line Ind. 6,* 44-48 (1957) April.

Portable units aboard tankers send pumping orders to shore radio station where coded emergency signal shuts down pumps remotely.
Author's Abstract

WHY TRANSCONTINENTAL LIKES COOL MICROWAVE STATIONS. *Pipe Line Ind. 6,* 36, 37 (1957) April.

First year of experience with 40 air-conditioned shacks shows a ten percent reduction in tube usage. Better transmitter stability and higher circuit availability are other advantages.
Editor's Abstract

Compression

Judah, M. A. TEXAS EASTERN'S NEW STATIONS PACK A POWERFUL PUNCH. *Pipe Line Ind. 6,* 40-47 (1957) July.

The company's initial operation of the giant 15,000 horsepower synchronous motor-centrifugal compressor units in mainline gas transmission service is described. Cost of the new single unit stations totaled only $114.04 per installed horsepower, about half the cost of older multiple unit stations. Two new dual 7600 horsepower gas turbine stations also performed well in early operating tests; three more will be in service this year.
Author's Abstract

Long, F. V. "SNOOPER" CONTROLS COMPRESSOR SURGES. *Pipe Line Ind. 6,* 41-43 (1957) April.
Unit developed by Texas Eastern communications engineers senses when a dangerous surge condition exists. It then takes corrective action through a pre-set feedback control system.
Author's Abstract

Wilcock, D. F. PREDICTING PERFORMANCE OF STARVED BEARINGS. *Lubrication Eng. 13,* 348-52 (1957) June.
This paper outlines a procedure for determining the performance of starved bearings. In certain cases, such as wick-fed and oil-ring bearings, the rate of oil feed must be determined empirically by experiment. An extension of this procedure permits the estimation of the time of operation before failure of bearings whose oil supply has been cut off. It is known from experiment that this time may be as high as several minutes. Author's Abstract

Dehydration

Swerdloff, W. WHAT WE'VE LEARNED IN 20 YEARS ABOUT GAS DEHYDRATION. *Oil Gas J. 55,* 122-29 (1957) April 29.
This roundup report on gas dehydrators gives

special information on the process design and operation of dehydration systems. G. Kunst

Drilling Patents

Fischer, P. W. (assigned to Union Oil Co.) CONDUCTIVE OIL-BASE DRILLING FLUIDS. U.S. 2,793,187 (1957) May 21.

Moore, P. J. (assigned to National Lead Co.) GAS EXTRACTING APPARATUS. U.S. 2,792,072 (1957) May 14.

Schuessler, A. G. (assigned to Swift and Co.) DRILLING FLUIDS AND EMULSIFIERS THEREFOR. U.S. 2,793,189 (1957) May 21.

Swain, C. B. and Schuessler, A. G. (assigned to Swift and Co.) EXTERNAL OIL PHASE DRILLING FLUID EMULSIONS. U.S. 2,793,188 (1957) May 21.

Field Operations

Campbell, J. M. ELEMENTS OF FIELD PROCESSING—32: COMPLEX LIQUID GATHERING SYSTEMS. *Oil Gas J. 55*, 127, 28 (1957) April 15.

Several examples of complex liquid gathering systems are presented and the fastest way of solving them is outlined. G. Kunst

Dow, W. M. (assigned to United Gas Corp.) METHODS OF AND MEANS FOR DEHYDRATING AND PROCESSING FLUID STREAMS. U.S. 2,790,505 (1957) April 30.

The invention is an improved method for use in dehydrating natural gas or gas streams flowing from high pressure gas-condensate or "distillate" wells. G. Kunst

Kridner, K. GAS WELL ANALYSIS WITH PORTABLE TESTING UNIT. *Gas 33*, 141, 46 (1957) May.

The test unit discussed here is equipped to permit the flow from the well to be diverted through the test unit, the liquid and gas separated and measured independently. G. Kunst

Kellner, C. H. EXPLOSIONGESCHUETZTE SCHALTANLAGE FUER EINEN ERDGASBETRIEB. (EXPLOSION PROTECTED CONTROL ARRANGEMENT FOR A NATURAL GAS PLANT). *Erdoel u. Kohle* (German) *10*, 312, 13 (1957) May.

To insure good operation of the Pfungstadt natural gas field in Germany, an explosion protected control equipment was added. The operation is described. G. Kunst

Peaslee, R. V. and Haines, J. F. (assigned to C. F. Braun and Co.) PROPANE RECOVERY. U.S. 2,794,334 (1957) June 4.

A refrigerant comprising aqueous methyl alcohol (60 to 90 percent) is contacted countercurrently at —5° to —70° F. in a separating column to remove propane, higher boiling LP-gas components and water from a rich raw gas. O. P. Brysch

Worley, M. S. and Laurence, L. L. OIL AND GAS SEPARATION IS A SCIENCE. *J. Petrol. Techn. 9*, 11-16 (1957) April.

A general review of the different types of gas and oil separation and the best methods for an efficient separation are presented. G. Kunst

Zak, A. J. Jr. and Griffin, P. EVALUATING D.S.T. DATA. *Oil Gas J. 55*, 122-26 (1957) April 15.

A drill-stem test can tell a great deal about what fluid and how much of it a new well will produce. It also can yield data on reservoir pressure, well-bore damage and average permeability. G. Kunst

H_2S Removal

Muhlbauer, H. G. and Monaghan, P. R. NEW EQUILIBRIUM DATA ON SWEETENING NATURAL GAS WITH ETHANOLAMINE SOLUTIONS. *Oil Gas J. 55*, 139-45 (1957) April 29.

The objective of this work is to develop data useful in the accurate design and operation of gas-treating plants. Further benefits may be realized through reduction in corrosion and more economic construction. G. Kunst

LP-Gas Storage

White, B. C. PLANT STORES REFRIGERATED PROPANE AT —46° F. *Gas 33*, 50-54 (1957) April; Amer. Gas Assoc. Monthly *39*, 12, 13 (1957) April.

The plant layout and equipment used in the propane air peak shaving plant of the Atlanta

Gas Light Co. at Riverdale, Georgia are described. This plant features refrigerated storage of propane. (See also *Gas Abs. 13*, 109 (June). G. G. Wilson

Meter Checking

Davis, L. M. METER FACTOR CONTROL CHARTS SOLVE MEASUREMENT PROBLEMS. *Petrol. Eng. 29*, D22-D25 (1957) May.

The use of meter factor control charts tells Trans-Northern operators the exact time and place meters go wrong and what is causing the trouble. The set up and use of such a chart are explained. G. Kunst

Otto, R. J. HOW PHILADELPHIA GAS WORKS DETECTS DEFECTIVE METERS. *Gas 33*, 86, 88, 89 (1957) May.

PWG's system of checking meters has greatly reduced the number of meter failures. Details of operation are outlined. G. Kunst

Offshore Operations

Howe, R. J. and Collipp, B. G. OFFSHORE MOBILE UNITS — PRESENT AND FUTURE. *Mech. Eng. 79*, 335-38 (1957) April.

The design of present offshore drilling rigs is described and future design changes are discussed. W. G. Bair

Pipeline Construction

Brundage, H. T. ARAMCO WHIPS 'SABKHAHS' ON RAS TANURA LINE. *Pipe Line Ind. 6*, 60-62 (1957) April.

"Soon to be completed" line has taken a variety of hurdles. Here is the story of how contractors overcame supply difficulties brought on by the Suez hostilities and unusually tough terrain conditions. Part of line is submarine; but 28 miles of the 22-inch line will be supported on pilings across the Arabian sabkhahs or salt flats. Author's Abstract

Hughes, R. C. Jr. PIPELINE CROSSES THE RIO GRANDE ON DRY GROUND. *Pipe Line Ind. 6*, 49-53 (1957) April; (*See also* Sterrett, E. *Pipeline News 29*, 29-33 (1957) June).

Texas Eastern Transmission Corp.'s new line takes in rugged terrain and expanses of water. Here are the details on the dry-ground laying of dual 20-inch lines across the Rio Grande. Author's Abstract

Reed, P. COMPLETELY MECHANIZED PIPELINE WELDING. *Oil Gas J. 55*, 104-07 (1957) April 22.

H. C. Price Co. has developed the first completely mechanized welding procedure, practicable for yard operation under extremes of atmospheric temperature previously considered prohibitive for welding. G. Kunst

Shibel, C. M. TALLY IT—BUT DON'T TOUCH IT. *Gas 33*, 57-61 (1957) April.

The use of the weight-rates method of maintaining a running inventory of the stock in a pipe storage yard is described. G. G. Wilson

Baird, R. C. PIPELINE BRIDGE VIBRATION—CAUSE AND CURE. *Petrol. Eng. 29*, D35-D41 (1957) May.

The cause of pipeline bridge vibration is explained. Wind-induced vibration is controlled by aerodynamic damper panels. G. Kunst

Taylor, D. M. WHY PIPELINES WILL CONTINUE TO EXPAND. *Petrol. Eng. 29*, D20, D21 (1957) May.

A short outline is given of the future pipeline construction. Charts indicate a continued expansion. G. Kunst

CHICAGO DISTRICT CROSSES THE DES PLAINES RIVER. *Gas 33*, 122-24 (1957) April.

A brief illustrated account of the methods used by the Chicago District Pipeline Company in a crossing of the Des Plaines River.
G. G. Wilson

THE WEATHER OUTSIDE IS FRIGHTFUL. *Gas 33*, 126, 28 (1957) April.

The use of portable welding huts to permit welding operations to be carried out during winds up to 30 miles per hour is described.
G. G. Wilson

WHAT'S HAPPENING IN PIPE LINE CONSTRUCTION. *Pipe Line Ind. 6*, 68-82 (1957) April.

Proposed pipeline construction is tabulated. The length, diameter, type, origin and terminus, estimated cost and status of each pipeline are listed. H. L. Feldkirchner

Pipeline Design

Kersten, R. D. and Waller, E. J. PIPELINE PRESSURE-SURGE PROBLEMS. *Oil Gas J. 55*, 112-18 (1957) May 6.

A new approach to this old problem is given here based on a five-year study of surge phenomena. New principles permitting better design are now undergoing formulation. The first design applications will probably be for reciprocating pump systems. G. Kunst

Mueller, H. EIN BEITRAG ZUR BERECHNUNG VON GASFERNLEITUNGEN. (A CONTRIBUTION TO THE CALCULATION OF LONG-DISTANCE GAS PIPELINES). *Gas- u. Wasserfach* (German) *98*, 353-60 (1957) April 12.

The previous calculation methods for pipelines, especially for long distance lines by means of flow formulas, were troublesome and time consuming. After a decade of development, engineers have turned to the simpler graphical procedure based on current-corrected flow-formulas which permits the desired values to be found quickly. The author presents three of these charts and gives examples for their use. G. Kunst

Production Conference

The following papers were presented at the Production Conference at Bal Harbour, Florida, on May 20 to 22, 1957, by the Operating Section, American Gas Association:

Billett, L. R. OPERATING EXPERIENCES WITH PUMP TYPE ODORIZERS, CEP-57-6.

Carroll, J. W. INVESTMENT AND OPERATING COSTS FOR PRODUCING HIGH BTU OIL GAS. CEP-57-4.

Curtis, A. C. DEVELOPMENT OF INTERNAL SEALANTS FOR GAS LINES. CEP-57-10.

Drake, F. E. BUILDERS' REPORT. CEP-57-1.

Dundore, D. A. UNIFORM TRAINING PRACTICES IN A MANUFACTURED GAS PLANT.

Elliott, M. A. RESEARCH FACILITIES OF THE INSTITUTE OF GAS TECHNOLOGY. CEP-57-8.

Fisher Scientific Co. and Inst. Gas Tech. A SELECTED BIBLIOGRAPHY ON GAS CHROMATOGRAPHY.

Hammerschmidt, E. G. NATURAL GAS DEHYDRATION PRACTICES. CEP-57-7.

Hodge, W. W. PROVISIONS OF NEW PUBLIC LAW NO. 660 FOR NATIONWIDE CONTROL OF WATER POLLUTION.

Holman, O. B. (compiler) RECENT DEVELOPMENTS IN OIL GAS PRODUCTION.

Minet, R. G. ECONOMICS OF THE CONTINUOUS FLUIDIZED CARBONIZATION (CFC) PROCESS FOR BITUMINOUS COAL. CEP-57-11

Murphy, C. R. POLYMERS AND CONDENSATION PRODUCTS FROM PARTIAL OXIDATION OF LP-GAS. CEP-57-5.

Oberseider, J. L. ECONOMIC AND ENGINEERING EVALUATIONS OF ALTERNATE METHODS FOR MEETING PEAK DEMANDS. CEP-57-15.

Pittman, C. U. CRUDE LIGHT OIL MARKETABILITY. CEP-57-16.

Plant Waste Disposal Sub-Committee, Amer. Gas Assoc. A SELECTED BIBLIOGRAPHY ON PLANT WASTE DISPOSAL.

Reid, J. M., Bair, W. G. and Linden, H. R. PRODUCTION OF HIGH-BTU OIL GAS IN A CYCLIC-REGENERATIVE PILOT UNIT WITH HYDROGEN AS CARRIER GAS. CEP-57-14.

Robey, T. L. RESEARCH IN REVIEW. CEP-57-51.

Stern, A. C. PROGRESS IN AIR POLLUTION INVESTIGATION UNDER PUBLIC LAW 159. CEP-57-12.

Van der Pyl, L. M. BIBLIOGRAPHY ON GAS CONDITIONING 1956 SUPPLEMENT. CEP-57-2.

Voelker, J. G. TREATMENT OF GAS PLANT EFFLUENT AND TAR HANDLING — POUGHKEEPSIE GAS PLANT. CEP-57-3.

Warner, C. W. FUNDAMENTALS OF GAS CALORIMETRY. CEP-57-9.

Whitis, T. S. TECHNICAL STEPS FOR PROOF OF ODORIZATION. CEP-57-50.

Wilson, G. G. and Ellington, R. T. INTERIOR SURFACE COATING OF PIPE FOR NATURAL GAS SERVICE. CEP-57-13; *Gas 33*, 107, 08, 12, 15, 16, 21 (1957) July.

Prospecting

Peterson, R. A. (assigned to United Geophysical Corporation) GEOPHYSICAL PROSPECTING SYSTEM. U.S. 2,792,067 and 2,792,068 (1957) June 14.

PVT Relationship

Campbell, J. M. NATURAL-GAS P-V-T RELATIONSHIPS. *Oil Gas J. 55*, 134-36 (1957) May 6.

A method is outlined for predicting the P-V-T relationship of natural gas, which is essential for all phases of field processing and reasonably accurate for all applications. G. Kunst

Reservoir Engineering

Berryman, J. E. THE PREDICTED PERFORMANCE OF A GAS-CONDENSATE SYSTEM. WASHINGTON FIELD, LOUISIANA. T. P. 4490. *J. Petrol. Techn. 9*, 102-07 (1957) April.

A method is presented for calculating the pressure depletion performance of a gas-condensate reservoir from the original reservoir fluid composition, using the laboratory determined pressure-production history and retrograde liquid accumulation as guides. G. Kunst

Eckles, W. W. Jr. COMPOSITION CORRELATIONS OF NATURAL GAS IN RESERVOIR ENGINEERING PROBLEMS. *J. Petrol. Techn. 9*, 61-63 (1957) May.

The use of well-gas composition correlations obtained from mass spectrometer recordings is reported as a means of identification and determination of reservoir continuity. Field applications are presented to illustrate the possibilities of the method at the present stage of development. G. Kunst

Fraser, J. R. ESTIMATE—DON'T GUESS ON GAS RESERVOIRS. *World Oil 144*, 193-98 (1957) April.

The open-flow potential test and a method for computing pressure drop in the tubing strings of flowing gas wells are reviewed. The problem of practical deliverability forecasting for gas reservoirs and a complete forecast of the producing history of a well in a common reservoir is given a thorough treatment. G. Kunst

Klingenberg, L. J. PORE SIZE DISTRIBUTION OF POROUS MEDIA AND DISPLACEMENT EXPERIMENTS WITH MISCIBLE LIQUIDS. *J. Petrol. Techn. 9*, 63-66 (1957) April.

The current concept of pore size distribution is not definite. A pore size distribution should not be based on the idea that cores should behave as non-interconnected capillaries of the same pore size distribution. Calculations and experiments on the displacement of miscible liquids were made. G. Kunst

Schauer, P. E. Jr. FRACTIONAL BALANCE EVALUATION OF PRESSURE MAINTENANCE, SMACKOVER LIME GAS CONDENSATE RESERVOIR, McKAMIE-PATTON FIELD, ARKANSAS. T. P. 4492. *J. Petrol. Techn. 9*, 108-13 (1957) April.

An evaluation of the pressure maintenance program for the McKamie-Patton condensate reservoir is presented, including a description of the fractional balance method employed to determine the benefits. G. Kunst

Telemetering

Burrell, R. E. TELEMETERING AND SUPERVISORY CONTROL FOR CENTRALIZED GAS DISPATCHING. *Gas Age 119*, 18-20 (1957) April 18.

Modern transmision equipment is described which results in more information over fewer channels. Automatic data logging is used to present data in its most usable form.

Author's Abstract

Sholar, J. O. MAXIMUM HIGH LOAD FACTOR MAINTAINED BY TELEMETERING. *Gas Age 119*, 25-28, 40 (1957) April 4.

An $18,000 telemetering investment was made by a transmission company to enable it to service interruptible customers 15 days longer than would otherwise have been possible.

E. B. Shultz

Transmission

The following papers were presented at the Transmission Conference at San Francisco, on May 8 to 10, 1957, at a joint session of the Pacific Coast Gas Association and the Operating Section of American Gas Association:

Bain, R. C. PULSATION IN THE COMPRESSOR STATION: A COMPLEX PROBLEM SOLVED BY CO-OPERATIVE RESEARCH. GSTS-57-8.

Corrin, E. W., Crutchley, W. F. and Foster, A. W. DISPATCHING TECHNIQUES IN THE UTILIZATION OF UNDERGROUND STORAGE. GSTS-57-8.

Cramer, F. R. MORE ABOUT WATER INJECTION.

Gaines, W. L. APPLICATION OF THE PLUG VALVE AS A PRESSURE AND FLOW CONTROLLER. GSTS-57-6.

Griffin, J. L. RECENT DEVELOPMENTS IN GAS MEASUREMENT. GSTS-57-4.

Hays, R. D. GAS LOAD CONTROL THROUGH TELEMETERING. GSTS-57-1.

Kenworthy, C. S. SUPERCHARGING HORIZONTAL ENGINES IN THE FIELD. GSTS-57-50.

Kniebes, D. V. PREVENTATIVE MAINTENANCE OF PIPELINE COMPRESSOR ENGINES BY LUBRICATING OIL ANALYSIS. GSTS-57-3; *Pipeline News 29,* 38-41 (1957) July.

Merritt, G. A. SAFETY — AS PRACTICED BY PACIFIC COAST UTILITIES.

Secor, D. T. SUMMARY OF REPORT OF SUBCOMMITTEE ON STATISTICS ON UNDERGROUND STORAGE.

Stannard, J. H. Jr. USE OF THE PLUG VALVE AS A CONTROL VALVE. GSTS-57-2.

Todd, R. W. THE DEVELOPMENT OF UNDERGROUND STORAGE IN THE PACIFIC COAST GAS INDUSTRY. GSTS-57-51.

Walker, C. J., Corliss, E. R., Miller, J. S. and Dunning, H. N. DELIVERABILITY TESTS ON GAS-STORAGE PROJECTS. GSTS-57-5.

Utility District

Holmes, W. M. HOW SEVERAL TENNESSEE COMMUNITIES FORMED THEIR OWN UTILITY DISTRICT. *Gas 33,* 79-83 (1957) April.

An account of the formation of a utility district to purchase and distribute natural gas to several small West Tennessee communities.

G. G. Wilson

Well Practice Patents

Bell, T. W. and Stone, H. C. (assigned to The Texas Co.) APPARATUS DETERMINING STATIC PRESSURES IN PUMPING WELLS. U.S. 2,792,709 (1957) May 21.

Carpenter, C. A. (assigned to Union Oil Co.) WELL HEATER. U.S. 2,792,895 (1957) May 21.

Graham, J. W. and McCardell, W. M., Osoba, J. S. and Richardson, J. G. (assigned to Esso Research and Engineering Co.) METHOD OF INCREASING OIL PRODUCTION. U.S. 2,792,894 (1957) May 21.

Johnston, R. W., Jr. and Shook, A. M. (assigned to Texas Co.) TESTING UNDERGROUND STORAGE CAVITIES. U.S. 2,792,708 (1957) May 21.

Keller, H. F., Jr., Nowak, T. J. and Fischer, P. W. (assigned to Union Oil Co.) SELECTIVE PLUGGING OF SUBTERRANEAN FORMATIONS. U.S. 2,792,893 (1957) May 21.

Moosman, J. A. (assigned to Johnston Testers, Inc.) ADJUSTABLE FLOW BEAN. U.S. 2,792,896 (1957) May 21.

Tausch, G. H. (assigned to Esso Research and Eng. Co.) METHOD OF RUNNING SMALL PIPE IN A TUBING STRING. U.S. 2,793,698 (1957) May 28.

Tubbs, H. A. ADAPTER FOR WELL CASING. U.S. 2,793,699 (1957) May 28.

Well Tools Patents

Billingsley, L. E. MUD AND SAND SEPARATOR FOR WELL DRILLING. U.S. 2,793,758 (1957) May 28.

Roxstroem, E. B. (assigned to Svenska Diamantbergborrnings Akt. Sweden) DEVICE FOR DETERMINING THE INCLINATION

AND DIRECTION OF DRILL HOLES IN THE GROUND. U.S. 2,791,035 (1957) May 7.

O'Reilly, W. M. and True, M. E. (assigned to Esso Research and Eng. Co.) CORE SIGNALLING DEVICE. U.S. 2,791,398 (1957) May 7.

Eckel, J. E. (assigned to Esso Research and Eng. Co.) OVERSHOT FOR CONTROLLING WILD WELLS. U.S. 2,793,700 (1957) May 28.

6. PETROLEUM AND SYNTHETIC LIQUID FUELS

Desulfurization

Heinemann, H., Kirsch, F. W. and Burtis, T. A. SELEKTIVE HYDRIER-ENTSCHWEFELUNG VON CRACKBENZINEN. (SELECTIVE HYDRO-DESULFURIZATION OF CRACKED GASOLINE.) *Erdoel u. Kohle* (German) *10*, 225-28 (1957) April.

Desulfurization processes with nickel-tungsten-sulfide catalysts to achieve 60% desulfurization without the loss of high octane number has been reported earlier. Here the authors achieved 80% desulfurization without the lowering of the octane number. These hydro-desulfurized fractions from a cobalt-molybdenum-clay treatment were then blended with non-hydrogenated ones. The conditions of the process required careful control and the selectivity itself was improved by the use of natural inhibitors which prevent an olefin hydrogenation.
G. Kunst

Fischer-Tropsch Catalysts

Stein, K. G., Thompson, G. P. and Anderson, R. B. CHANGES IN IRON CATALYST AND THE FISCHER-TROPSCH SYNTHESIS. *Ind. Eng. Chem. 49*, 410 (1957) March.

A precipitated iron and copper oxide-potassium carbonate catalyst and both reduced and nitrided samples of a promoted, fused iron oxide of the type used in ammonia synthesis were investigated. After synthesis, precipitated catalysts had virtually no surface area or pore volume. For reduced catalysts, converted largely to magnetite and carbides, total volume increased, but pore volume and surface area were nearly zero. Nitrided catalysts had a small pore volume and surface area, but total volume was relatively large. Thus, changes in iron catalysts must be considered when designing Fischer-Tropsch process equipment.
Authors' Abstract

Oil Hydrogenation

Clough, H. GASOLINE PRODUCTION FROM COAL TAR OILS. *Ind. Eng. Chem. 49*, 673-78 (1957) April.

Motor and aviation fuels are produced from the creosote fraction of coal tar by hydrogenation in two steps. Hydrofining over cobalt molybdate is followed by hydrocracking over nickel on silica-alumina. E. B. Shultz

Cottingham, P. L., White, E. R. and Frost, C. M. HYDROGENATING SHALE OIL TO CATALYTIC REFORMING STOCK. *Ind. Eng. Chem. 49*, 679-84 (1957) April.

Shale oil hydrocracking at higher temperatures than previously investigated was carried out to increase the aromatics content of the gasoline yields. Decreases in liquid yields accompanied by sharp increases in gasoline octane number did not begin until temperatures of about 900° F. were exceeded. E. B. Shultz

Eberline, C. R., Wilson, R. T. and Larson, L. G. HYDROTREATING CRACKING STOCKS. *Ind. Eng. Chem. 49*, 661-63 (1957) April.

Mild (non-destructive) hydrogenation was used at 500 psi to upgrade gas oils for catalytic cracker feedstock. Boiling range was not appreciably altered, but sulfur and nitrogen were eliminated, olefins were saturated and unstable coke-formers were stabilized. Carbon yields in catalytic cracking were reduced 26-30% by hydrotreating. E. B. Shultz

Gwin, G. T., Heinrich, R. L., Hoffman, E. J., Manne, R. S., Meyer, H. W. H., Miller, J. R. and Thorpe, C. L. HYDROGENATION OF ASPHALT FOR FUEL PRODUCTS. *Ind. Eng. Chem. 49*, 668-72 (1957) April.

Conditions used were 400-800 psi at 725°-825° F. with cobalt molybdate. Continuous operation without air regeneration for 500 hours or more was realized with conversions to lower boiling products of up to 60 vol. percent of the feed. In the first 100-150 hours with fresh catalyst, rapid decline in catalyst activity was noted, but beyond this point activity level was constant for several hundred hours. A new

aromatics characterization analysis, based on high resolution nuclear magnetic resonance measurements, was applied in this work.
E. B. Shultz

Stevenson, D. H. and Heinemann, H. RESIDUUM HYDROCRACKING. *Ind. Eng. Chem. 49,* 664-67 (1957) April.

Residual oils were hydrocracked at 3500 psi to high yields of distillate fractions with no significant loss of catalyst activity by adding about 35% butanes to the residuum before charging. Nickel oxide and nickel sulfide or alumina, and cobalt molybdate were used as catalysts. Of these, cobalt molybdate was the most active; reduction in residual content was greatest and gasoline yields were highest (about 20%). E. B. Shultz

Thompson, C. E., Stewart, J. and Langer, A. W. Jr. (assigned to Esso Research and Eng. Co.) TWO-STAGE HYDROGEN DONOR DILUENT CRACKING PROCESS. U. S. 2,791,541 (1957) May 7.

In the HDDC process (hydrogen donor diluent cracking), a heavy oil is mixed with an aromatic naphthenic material (hydrogen donor), and the mixture is thermally cracked. The donor contains polycyclic partially condensed ring aromatics prepared by partial hydrogenation of catalytic cycle stocks or tars. The donor takes up hydrogen in the hydrogenation zone and releases it to a hydrogen deficient oil in the cracking zone. The residual oil feedstock does not contact the hydrogenation catalyst directly and does not impair its activity; light gas and coke production are usually low. A two-step HDDC process is proposed in this patent. The first stage would convert a heavy oil to naphtha and gas oil; the second would convert the gas oil to gasoline. The HDDC process would avoid the typical 5-10 wt percent carbon and 15-25 wt percent light gases production occuring with catalytic cracking. E. B. Schultz

Oil Transportation

FREE COMPETITION RESULTS IN FAST ACTION. *Pipe Line Ind. 6,* 4 (1957) April.

The actions taken by U.S. pipeline companies to overcome the shortage of pipeline capacity needed to move oil from producing to shipping centers during the Suez Canal crisis demonstrate the fast action possible in a system of free competition. H. L. Feldkirchner

Petroleum Outlook

Gonzalez, R. J. PETROLEUM FOR OUR FUTURE PROGRESS. *J. Petrol. Techn. 9,* 14-21 (1957) March.

Because of improved producing techniques and additional discoveries, the Dept. of Interior considers 300 billion bbl as the ultimate reserves of the United States to be reasonable. As more oil is discovered, the estimate of ultimate production will continue to be pushed upward. The amount to be found will be affected by imports and taxation of domestic production. National policies should be designed to encourage development of domestic resources. Author's Abstract

Hoover, H. Jr. PETROLEUM AND OUR NATIONAL SECURITY. *Indep. Petrol. Assoc. Amer. Monthly 28,* 52-54, 76-77 (1957) May.

The author reviews, for the AAPG, the importance of petroleum and its reserves in the U.S. energy supply, and the industry's capacity to meet the Suez emergency. Problems of depletion, imports, and government interference are mentioned. O. P. Brysch

Refining Directory

PETROLEUM PROCESSING'S 1957 REFINERY DIRECTORY UNITED STATES AND CANADA. *Petrol. Processing 12,* 79-152 (1957) May.

A complete refinery directory of 359 plants for both the United States and Canada is listed, as well as a 55-page glossary of 168 refining processes and a coded cross-reference system relating the process, with engineering design and construction firms. These lists are presented as the "1957 Refining Industry Report."
H. A. Dirksen

Reservoir Sands

Baptist, O. C. and Sweeney, S. A. PHYSICAL PROPERTIES AND BEHAVIOR OF THE NEWCASTLE OIL-RESERVOIR SAND. U.S. Bur. Mines Rep. Invest. 5331 (1957) April.

The studies report laboratory data for persons studying the susceptibility of the Newcastle

(Wyoming) sand reservoir to secondary recovery methods. The physical properties and behavior of samples of reservoir sand as observed in the laboratory are reported and are not intended to describe reservoir properties. These results should be useful, however, in estimating original reservoir conditions and in predicting changes by the injection of various fluids for secondary-recovery purposes. G. Kunst

Sahara Oil

FRANCE STARTS PUSH FOR SAHARA OIL OUTPUT. *Petrol. Week 4,* 56-58 (1957) April 12.

Plans are outlined for investment of $800 million up to 1960 in French Algeria to develop Sahara oilfields discovered recently at Hassi Messaoud and Edjele, 660 and 1200 miles, respectively, south of the Algerian coast. In nine months $170 million is to be spent on Hassi Messaoud, in drilling, and in railroad and tank truck transport. Later activities will include exploration, steel and pipe mill, and pipelines to a coastal refinery. O. P. Brysch

Thermal Recovery of Oils

Ljungstroem, F. (assigned to Svenska Skifferolje Akt. Sweden). DEVICE FOR RECOVERING FUEL FROM SUBTERRANEOUS FUEL-CARRYING DEPOSITS BY HEATING IN THEIR NATURAL LOCATION USING A CHAIN HEAT TRANSFER MEMBER. U.S. 2,789,805 (1957) April 23.

Oils are thermally recovered from their geological deposits by heating the well-bottom formations in situ by means of a heated chain lowered into the well. The chain, reciprocable by motor, is heated in a furnace space at wellmouth, over a controllable portion of its length. O. P. Brysch

Stewart. J., Fulton, S. C. and Langer, A. W. Jr. (assigned to Esso Research and Eng. Co.) RECOVERY OF OIL FROM BITUMINOUS SANDS. U.S. 2,772,209 (1956) November 27.

Oil is extracted from oil sands by forming a liquid slurry with a hydrogen-donor diluent boiling between 500° and 700° F. and heating it non-catalytically in a soaking zone to 750°-900° F. at 500 psig for 10 to 120 minutes. The hydrogen donor is prepared by partial hydrogenation of thermal tar. E. B. Shultz

Thermal Drive Patents

Morse, R. A. (assigned to Pan American Petroleum Corp.) OIL RECOVERY BY UNDERGROUND COMBUSTION. U.S. 2,793,696 (1957) May 28.

Simm, C. N. and De Priester, C. L. (assigned to California Research Corp.) METHOD OF REESTABLISHING IN SITU COMBUSTION IN PETROLIFEROUS FORMATIONS. U.S. 2,793,697 (1957) May 28.

7. ANALYTICAL METHODS AND TESTS

Air Pollution

JET AIR SAMPLER. *Chem. Eng. News 35,* 94 (1957) May 13.

Du Pont's lightweight, explosion-proof air sampler will help pollution experts to take samples under operating conditions and in crowded places. G. Kunst

Carbonyl Sulfide Determination

Bruss, D. B., Wyld, G. E. A. and Peters, E. D. POTENTIOMETRIC METHOD FOR DETERMINATION OF CARBONYL SULFIDE IN PETROLEUM GASES. *Anal. Chem. 29,* 807-09 (1957) May.

Carbonyl sulfide in petroleum gases can be determined by absorption in alcoholic monoethanolamine solution, followed by potentiometric titration with a 0.01M solution of silver nitrate in isopropyl alcohol. Mercaptans and hydrogen sulfide are first removed from the gas stream with 30% caustic solution.

Authors' Abstract

Chromatography

Horn, O., Schwenk, U. and Hachenberg, H. UEBER DIE GASCHROMATOGRAPHIE. (ON GAS CHROMATOGRAPHY). *Brennstoff-Chemie* (German) *38,* 116-20 (1957) April 17.

The elements of gas chromatography are explained and a commercial apparatus containing carbon dioxide as carrier gas according to Janak is described. The experience gained with gas chromatography devices with a heat conductivity cell detector, as well as the preparation of pure gases by this method, is reported. G. Kunst

Kyrycos, G. and Boord, C. E. SEPARATION OF HYDROGEN, OXYGEN, NITROGEN,

METHANE, AND CARBON MONOXIDE BY GAS ADSORPTION CHROMATOGRAPHY. *Anal. Chem. 29*, 787, 88 (1957) May.

Gas chromatography with a column packed with a molecular sieve is used to determine oxygen consumed in cool flame oxidation of hydrocarbons. Hydrogen, methane, and carbon monoxide are determined in the products.

Authors' Abstract

Stewart, J. E. INFRARED SPECTRA OF CHROMATOGRAPHICALLY FRACTIONATED ASPHALTS. *J. Res. Nat. Bur. Standards 58*, 265-69 (1957) May.

Undegraded and weathered specimens of three roofing asphalts were chromatographically separated into three components after removal of the asphaltenes. The infrared absorption spectra of the fractions, recorded in the 2- to 15-μ spectral region, provide information about the chemical constitution of the material, the differences among asphalts from different sources, and the changes in constitution produced by weathering.

Author's Abstract

Gamma Ray Spectra

Baker, P. E. NEUTRON CAPTURE GAMMA-RAY SPECTRA OF EARTH FORMATIONS. T. P. 4483. *J. Petrol. Techn. 9*, 97-101 (1957) March.

Neutron capture gamma-ray spectra were obtained under simulated borehole conditions for artificial formations of sand and fresh water, dolomite and fresh water, and synthetic anhydrite and water. Qualitative analysis for hydrogen, chlorine, calcium, silicon, sulfur, and magnesium was possible. The various formations could be identified by their neutron capture gamma-ray spectra. Author's Abstract

Muench, N. L. and Osoba, J. S. IDENTIFICATION OF EARTH MATERIALS BY INDUCED GAMMA-RAY SPECTRAL ANALYSIS. *J. Petrol. Techn. 9*, 89-92 (1957) March.

Various earth materials were subjected to bombardment by neutrons from a polonium-beryllium source, and the spectra of the resultant gamma radiation were analyzed. Geometry of the laboratory system was designed to simulate wellbore conditions. Some elements not only can be identified with relative ease, but also can be determined quantitatively.

Authors' Abstract

Rubin, S., Passell, T. O., and Bailey, L. E. CHEMICAL ANALYSIS OF SURFACES BY NUCLEAR METHODS. *Anal. Chem. 29*, 736-43 (1957) May.

Nuclear methods are well suited to determination of elements and isotopes at solid surfaces because of high sensitivity and selectivity for surface layers. Nuclear scattering and nuclear reactions produced by bombardment with energetic protons and deuterons are applied to determination of a number of elements in a variety of samples. Principles, instrumentation, and results are given. Authors' Abstract

Infrared Applications

Williams, V. Z. INFRARED THE FRONTIER FREQUENCY. *Res. and Eng. 3*, 10-14, 34, 35 (1957) May.

While nuclear fission captures headlines, a quieter scientific evolution in infrared radiation is having equally far-reaching effects and finding new and extensive use in industry. It is used in analytical devices for automatic recording of explosive gases or breaks in gas mains; or in pollution detection of hydrocarbons and carbon monoxide traces. Applications in pyrometry and temperature-based automatic control are numerous. G. Kunst

Iron Reagent

Feigl, F. and Caldas, A. DETECTION OF TRACES OF IRON. *Anal. Chem. 29*, 580-82 (1957) April.

A 2% solution of 2,2'-bipyridine or phenanthroline in concentrated thioglycolic solution will give the characteristic red color of bivalent iron with traces of trivalent iron. The test may be used directly for many mineral products as well as for detection of iron in ammoniacal copper solution. For most alloys, mineral acids, and water it is best to collect the iron first on aluminum hydroxide.

Authors' Abstract

Naphthalene Impurity

Mastrangelo, S. V. R. and Dornte, R. W. THE SYSTEM NAPHTHALENE-THIANAPHTHENE. *Anal. Chem. 29*, 794-97 (1957) May.

The system naphthalene-thianaphthene has been investigated by calorimetric and freezing curve methods to evaluate purity of naphthalene containing small amounts of thianaphthene as impurity. The solid solutions phase

diagram, including liquidus and solidus lines, was determined and also heat of fusion as function of composition. Authors' Abstract

Organic Nitrogen Method

Morgan, G. B., Lackey, J. B. and Gilcreas, F. W. QUANTITATIVE DETERMINATION OF ORGANIC NITROGEN IN WATER, SEWAGE, AND INDUSTRIAL WASTES. *Anal. Chem. 29,* 833-35 (1957) May.

A modified Kjeldahl method for routine determination of organic nitrogen in sewage and industrial wastes uses mercuric sulfate-potassium sulfate catalyst. Comparison is made with other Kjeldahl procedures. Authors' Abstract

Physical Gas Analysis

Sand, P. T. PHYSICAL ANALYSIS OF GASES. *Canad. Chem. Proc. 41,* 114-16, 118, 120 (1957) May.

Continuous measurement of gas composition for process control is briefly described. Technique is outlined for: (I) Purely physical instruments, measuring the thermal conductivity, heat of reaction, magnetic susceptibility or infrared absorption of the gas, and (II) Physical-chemical devices, in which a chemical reaction plays a role in detection of a component giving changes in heat evolution, electrical conductivity, or color, with diagrams and applications.
O. P. Brysch

8. GENERAL AND PHYSICAL CHEMISTRY

Air Liquefaction

Bonnaud, H. (assigned to L'Air Liquide) METHOD FOR OBTAINING KRYPTON AND XENON. U. S. 2,793,511 (1957) May 28.

Krypton and xenon can be obtained by washing a gaseous mixture (such as air) with a more volatile liquefied gas mixture and then concentrating the resulting liquid. G. Kunst

Hnilicka, M. P. (assigned to Amoco Chemicals Corp.) RECOVERY OF KRYPTON AND XENON. U. S. 2,793,507 (1957) May 28.

Recovery is directed to a more economical process and apparatus for obtaining krypton and xenon from air as a by-product during the recovery of oxygen. G. Kunst

Kerry, F. G. SAFETY ASPECTS OF MODERN AIR SEPARATION PLANT CYCLES. *Chem. Eng. Progress 53,* 181-84 (1957) April.

Following earlier articles on the subject, this article discusses air liquefaction plants in a very general manner. Possible solutions to the problem of air contaminants are listed. Recommendations for future studies are made.
C. L. Tsaros

Rice, P. K. (assigned to Union Carbide and Carbon Corp.) PROCESS OF AND APPARATUS FOR LOW-TEMPERATURE SEPARATION OF AIR. U.S. 2,788,646 (1957) April 16.

The invention claims an improved process and apparatus for low-temperature air products. The improvement consists of a simplification or elimination of refrigeration producing equipment which results in reduction of time and cost of starting an air-separation system.
G. Kunst

Catalysts

Hall, W. K. and Emmett, P. H. AN IMPROVED MICROCATALYTIC TECHNIQUE. *J. Amer. Chem. Soc. 79,* 2091-93 (1957) May 5.

An improved new microcatalytic technique, capable of yielding reproducible catalyst testing data, is outlined. The utility of the method in a kinetic study of the catalytic hydrogenation of ethylene is described, and advantages of the technique over conventional methods are discussed. Authors' Abstract

Plank, C. J., Sibbett, D. J. and Smith, R. B. COMPARISON OF CATALYSTS IN CRACKING PURE METHYLCYCLOHEXANE AND n-DECANE. *Ind. Eng. Chem. 49,* 742-49 (1957) April.

Typical silica-alumina, silica-magnesia and fluoride-treated silica-alumina catalysts were used at 495° C. The fluoride-treated was most active and silica-magnesia least active for carbon chain-splitting, hydrogen-transfer and polymerization. Interpretation in terms of a Lewis acid mechanism is given. E. B. Shultz

Gas Diffusion and Separation

Keyes, J. J. Jr. and Pigford, R. L. DIFFUSION IN A TERNARY GAS SYSTEM WITH APPLICATION TO GAS SEPARATION. *Chem.*

Eng. Science (British) *6*, 215-26 (1957) April/May.

Partial separation of the components of a binary gas system can be effected by diffusion of the gases through a third gas or vapor, provided there exists a difference in the diffusivities of the binary components with respect to the third component. Measurements are reported for the partial separation of hydrogen and nitrogen via diffusion through methanol and cyclohexane for the cases of stagnant vapor and countercurrent flow of vapor relative to the binary system gases. Comparison of the data and theory was facilitated through the use of one-dimensional geometry in the diffusion zone. A number of theoretical relationships are given for various initial conditions and various boundary conditions.

C. G. von Fredersdorff

Gas Luminescence

Brown, L. O. and Miller, N. α-RAY INDUCED LUMINESCENCE OF GASES. *Faraday Soc. Trans.* (British) *33*, 748-59 (1957) June.

A photomultiplier study of the luminescence induced by a fixed source of polonium 210 in argon, carbon dioxide, and nitrogen, with mixtures of these with quenching vapors, showed that the phenomenon was explicable on current ideas as to α-ray excitation and energy transfer by collision. In some cases energy transfer resulted in luminescence of the minor component where that of the major lay in the ultraviolet and was thus not detectable. An extension of these techniques using higher source strengths and improved resolution may prove useful in the study of the emission spectra of molecules. Authors' Abstract

Isotopes

Newacheck, R. L., Beaufait, L. J. Jr. and Anderson, E. E. ISOTOPE MILKER SUPPLIES BA-137 FROM PARENT CS-137. *Nucleonics 15*, 122-25 (1957) May 5.

An automatic pneumatically-controlled elutriating cartridge containing barium-137 can supply approximately 20 injections of the short-lived, gamma emitter cesium-137 for reproducible tracer studies. Other useful long-lived parent and short-lived daughter isotope pairs include strontium-90: yttrium-90 and barium-140: lanthanum-140. Applications consist of leak detection; flow distribution and flow rate measurements. C. G. von Fredersdorff

Oxygen Removal

Reich, M. and Kapenekas, H. NITROGEN PURIFICATION. *Ind. Eng. Chem. 49*, 869-73 (1957) May.

Nitrogen is deoxygenated by scrubbing it with an aqueous solution of sodium dithionite. A packed absorption column located in the pilot plant is employed for the gas scrubbing operation. A scrubbing solution, buffered with trisodium and tripotassium phosphate and containing zinc sulfate and 7.2 pounds of sodium dithionite in 100 pounds of water, purified about 40,000 cubic feet of commercial nitrogen of an oxygen content of about 0.10% to less than 0.03% of residual oxygen, and lasted for 12 days before the sodium dithionite was depleted. Authors' Abstract

Phase Equilibria

Hamilton, G. E. and Metzner, A. B. VAPOR PHASE HYDRATION OF ETHYLENE OXIDE OVER ACIDIC ION EXCHANGE RESIN CATALYSTS. *Ind. Eng. Chem. 49*, 838-46 (1957) May.

The mechanism and kinetics of the catalyzed vapor phase hydration of ethylene oxide to glycols were studied on Amberlite IR-120 and IRC-50 cation exchange resins (H^+ form) as catalysts; catalyst particle diameters, 0.25 and 0.71 mm.; 110° to 200° C.; modified Reynolds numbers, 10 to 60; molar ratios, steam-ethylene oxide, 7.5 to 32; total pressure, 1.2 atm. Below 110° C. ethylene oxide was physically absorbed; from 110° to 140° C. weak chemisorption prevailed; above 140° C. stronger chemisorption took place. For this reason the rate-controlling mechanisms changed at about 110° and 140° C. Between these temperatures distribution of products and reaction rate are controlled by mass transfer of products from surface of catalysts into gas stream; competition between reactants and products for adsorption sites; and rate of chemical reaction between adsorbed reactants. Authors' Abstract

Baker, L. C. W. and Anderson, T. F. SOME PHASE RELATIONSHIPS IN THE THREE-COMPONENT LIQUID SYSTEM CO_2-H_2O-C_2H_5OH AT HIGH PRESSURES. *J. Amer. Chem. Soc. 79*, 2071-74 (1957) May 5.

Phase diagrams for the liquid system CO_2-H_2O-C_2H_5OH are reported, covering the tem-

perature range 10°-50° C at pressures from 3000 psi down to the vapor pressures of the respective mixtures. Liquid-vapor critical data are included. Authors' Abstract

9. ORGANIC CHEMISTRY, AND PETROCHEMICALS

Acetylene Recovery

Bogart, M. J. P., Mekler, V. and Davis, H. R. (assigned to The Lummus Co.) ACETYLENE PRODUCTION. U.S. 2,789,149 (1957) April 16.

The production of acetylene from hydrocarbons by high-temperature cracking is increased by an improved method of quenching the raw cracked gas containing acetylene. Improved heat recovery with a reduction in the feed dilution steam requirements is claimed.

H. L. Feldkirchner

Goins, R. R. and Begley, J. W. (assigned to Phillips Petroleum Co.) REGENERATIVE FURNACE AND CONVERSION OF HYDROCARBONS THEREIN TO ACETYLENE AND ETHYLENE. U. S. 2,792,437 (1957) May 14.

A novel regenerative furnace for thermally cracking low boiling hydrocarbons has been developed consisting of two main refractory checkerworks separated by a combustion section. H. L. Feldkirchner

Irvine, R. L. (assigned to Koppers Co.) REMOVAL OF ACETYLENE COMPONENTS FROM GAS. U.S. 2,787,335 (1957) April 2.

The absorption of acetylene from refinery gas or similar fuel gas is accomplished by using a solvent such as acetone at moderate presure. The off-gas is passed to a turbo-expander and the resultant cooling produces the liquefaction of the solvent and its subsequent recovery.

W. G. Bair

Aromatics from Oil

OIL CRACKING EQUIPMENT IN NEW SOUTH WALES. *Gas World* (British) *145*, 710, 711, 721 (1957) April 6.

The Petroleum and Chemical Corp. (Australia) produces aromatic chemicals, olefins, and tars from heavy residual oils in a new Semet-Solvay high- Btu oil gas plant at Silverwater, near Sydney, N.S.W. Three cyclic regenerative reverse-flow units, completely instrumented and hydraulically operated, can produce a maximum of 12.5 million CF/day of 1000 Btu oil gas. The byproduct gas from the hydrocarbon extraction is sold to Australian Gas Light Co.

O. P. Brysch

Coating Chemicals

Sherwood, P. W. PART II: THE ROLE OF PETROCHEMICALS IN SURFACE COATINGS. *World Petroleum 28*, 60-62 (1957) April.

Following Part I, in which 21 petroleum-derived compounds were classified by their relative importance in the surface coating industry, this article concentrates primarily on the position of the chemicals in this category in the petrochemical industry. G. Kunst

Hydrorefining of Benzene

Thomas, M. A. RAFFINAGE CATALYTIQUE DE BENZOL BRUT. (CATALYTIC REFINING OF CRUDE BENZENE). *J. Usines Gaz* (French) *81*, 203-05 (1957) May.

The Lorraine Central Benzol Refinery at Carling, built by Koppers under license from B. A. S. F.-Scholven, started in November 1956 to refine crude benzene by catalytic hydrogenation. In the first phase the output was 60,000 tonnes, and in the second phase 12,000 tonnes. Classical H_2SO_4 refining formerly gave yields of only 81-85%, with poor (100 mg/kg) sulfur content. The catalytic refining, using H_2 under pressure, gave yields to 96%, with 40 to 100 mg S content. This procedure eliminates all CS_2, phenols, thiophene and pyridines. The present plant uses directly the hydrogen contained in coke oven gas. The hydrogenation feed is a mixture of crude benzol vapor and oven gas (1:3 by volume) fed to a molybdenum-alumina catalyst at 300-360° C. and 50 to 70 kg/cm^2. G. Amerika

Naphthalene Purification

Lang, K. F., Damm, P. and Turowski, J. (assigned to Rutgerswerke-A. G. Frankfurt) METHOD OF PRODUCING CRYSTALLINE NAPHTHALENE. U.S. 2,790,017 (1957) April 23.

This method has particular application to the production of naphthalene crystals from coal tar products. It features a quick mixing of a naphthalene-tar fraction with a cold aqueous liquid, further cooling of the mixture, and subsequent formation of naphthalene crystals.

H. L. Feldkirchner

Oxidation of Peat

Piret, E. L., Hein, R. F., Besser, E. D. and White, R. G. OXIDATION OF PEAT TO ORGANIC ACIDS. *Ind. Eng. Chem. 49,* 737-41 (1957) April.

Water-soluble polycarboxylic acids were obtained by alkaline permanganate oxidation. Regenerated humic acids were produced by nitric acid or air oxidation. Comparisons are drawn with coal oxidation products. E. B. Shultz

Paraffin-Tar Extracts

Gundermann, E. ZUR FRAGE DER ZERLEGUNG EINES BRAUNKOHLENTEER-PARAFFINOELS MIT SELEKTIVEN LOESUNGSMITTELN. (CONTRIBUTION TO THE EXTRACTION OF BROWN-COAL TAR-PARAFFIN OILS WITH SELECTIVE SOLVENTS). *Erdoel und Kohle* (German) *10,* 228-30 (1957) April.

A considerable number of extractions were performed on a paraffin oil with various solvents for the purpose of producing a raffinate in high yield with a small content of creosotes, asphalts and dark-colored substances. Experiments were done with methanol or ketones and with methanol supersaturated with hydrocarbon to give a solid-liquid phase. G. Kunst

Paraxylene Recovery

Bennett, R. B. (assigned to Esso Research and Engineering Co.) RECOVERY OF PARAXYLENE BY CRYSTALLIZATION. U.S. 2,790,-018 (1957) April 23.

Two crystallization methods are shown for recovering high-purity paraxylene from a hydrocarbon mixture containing 12-25% paraxylene by volume and at least one other isomeric xylene. H. L. Feldkirchner

10. CHEMICAL ENGINEERING

Dust Removal

Haas, P. A., Nurmi, E. O., Whatley, M. E. and Engle, J. R. MIDGET HYDROCLONES REMOVE MICRON PARTICLES. *Chem. Eng. Progress 53,* 203-07 (1957) April.

Hydraulic cyclones less than one inch in diameter were developed to remove 1-micron particles from aqueous solutions of uranyl sulfate. These particles were either fissive or corrosion products from nuclear recators. The major advantages of the hydroclones are simplicity, small size, high efficiency, and high capacity. Dimensional and flow capacity correlations are presented. C. L. Tsaros

Lenehan, J. W. (assigned to Research Corp.) GAS CLEANING APPARATUS. U.S. 2,788,-087 (1957) April 9.

This patent descibes a cyclone-type dust separator having a conical filter element mounted coaxially within the housing and connected to the gas outlet tube. E. J. Pyrcioch

Steele, M. J. INDUSTRIAL GAS PURIFIER. U. S. 2,793,847 (1957) May 28.

This apparatus employs two concentric counter-rotating cones with perforated walls for contacting dust-laden gas with water and removing the dust as a sludge. E. J. Pyrcioch

Gas Liquefaction

Schuftan, P. M. (assigned to British Oxygen Co. Ltd.) PROCESS OF AND APPARATUS FOR SEPARATION OF GAS MIXTURES. U.S. 2,788,638 (1957) April 16.

This invention relates to the separation of gas mixtures (such as air) by liquefaction and subsequent rectification. The invention is particularly useful for the production of oxygen of content above 99%. G. Kunst

Grinding

Callcott, T. G. BALL MILLS AND BALL MILLING. (BCURA Review No. 167) *Brit. Coal Utilzn. Resch. Assoc. Monthly Bull. 21,* 101-20 (1957) March; Ibid. 153-71 April.

Various types of ball mill used in industry are described, and mill performances are compared chiefly for ore and cement grinding. Three main types, cylindrical, conical and vibratory, and their method of application are treated. Affected by the factors of: a) size and shape of mill, b) angular velocity, c) nature, amount and size of feed, d) size, shape, density and quantity of grinding media, e) method of operation, performance cannot yet be predicted completely. Therefore, until a unifying theory is established, mill design and evaluation must be based on the empirical knowledge from past installations. References cited total 193 items. E. J. Pyrcioch

Riley, R. V. RECENT DEVELOPMENTS IN SIZE REDUCTION. *Chem. Process Eng.* (British) *38*, 229-33, 240 (1957) June.

This review includes brief summaries of five recent papers dealing with the theory of grinding and a discussion of recent developments in crushers, mills and fine grinders and fine-grinding applications. An extensive list of patents is included in the references. E. J. Pyrcioch

Schulz, N. F., Cooke, S. R. B. and Piret, E. L. ENERGY-NEW SURFACE RELATIONSHIP IN THE CRUSHING OF SOLIDS. *Chem. Eng. Progress 53*, 254-58 (1957) May.

Use of low-grade ores usually requires extensive size reduction. A reevaluation of the effect of temperature on the crushing process was initiated. Crushing of magnetite, taconite, quartz, hematite, and glass was studied from —58°-400° C using energy inputs from 35 to 100 kg/cm per gram. Resistance to crushing was independent of temperature, and new surface was approximately in linear proportion to energy input. C. L. Tsaros

Heat Transfer

Kusuda, T. GRAPHICAL METHOD SIMPLIFIES DETERMINATION OF AIR-COIL, WET-HEAT-TRANSFER SURFACE TEMPERATURE. *Refrigerating Eng. 65*, 41-45, 74, 76, 78, 80 (1957) May.

A simple and quick method was developed to determine wet heat-transfer surface-temperature of an air coil. This method determines the wet coil capacity as well by using the psychrometric chart, rather than by trial and error method. Explanations by equations, charts, examples are given. G. Kunst

Kwong, S. S. and Smith, J. M. RADIAL HEAT TRANSFER IN PACKED BEDS. *Ind. Eng. Chem.* 49, 894-903 (1957) May.

Radial temperature profiles were measured by passing air and ammonia through tubes packed with alumina and steel spheres. Using an IBM card-programmed computer, effective thermal conductivities were calculated from temperature profiles at two bed depths; k_e showed considerable change with radial position, the values decreasing rapidly near the tube wall. When compared with results obtained from temperature profiles, calculations based on theory predict the effects of particle size and gas and solid properties reaonably well, but the maximum in k_e at an intermediate radial position is not reproduced. Application of the theory requires information for mass velocity, Peclet number, and void fraction profiles and convection heat transfer coefficient between particle and gas. Inadequate data for these may explain poor agreement. Authors' Abstract

Rubin, F. L. UPDATING HEAT EXCHANGER COSTS. *Chem. Eng. 64*, 257, 58 (1957) May.

New data are given for pricing standard types of heat exchangers fabricated from various metals. W. G. Bair

Mass Transfer

Potter, O. E. MASS TRANSFER BETWEEN CO-CURRENT FLUID STREAMS AND BOUNDARY LAYER SOLUTIONS. *Chem. Eng. Science* (British) *6*, 170-82 (1957) April/May.

The author discounts the earlier film theory in favor of the present concept of the boundary layer to derive a series of relationships applicable for mass transfer between streams in concurrent flow. A complete derivation is given, starting with the Prandtl modification of Navier-Stokes equations for fluid motion, and following with the von Karman momentum equation applied to concurrent fluid streams having a non-fluctuating boundary. Through the assumption of an empirical velocity distribution law, and by application of suitable boundary conditions, the momentum equation is integrated to yield an expression for the boundary layer thickness. By use of the similarity existing between momentum transfer and mass transfer, an approximate mass transfer relationship is obtained. The analysis is extended to mass transfer in the boundary layer, and with assumption of the velocity profile, expressions for concentration gradients in the boundary layer are obtained. C. G. von Fredersdorff

Nuclear Power

Metcalf, H. E. (assigned to United States of America) METHOD AND MEANS OF PRO-

DUCING STEAM IN NEUTRONIC REACTORS. U.S. 2,787,593 (1957) April 2.

The patent refers to the production of superheated steam in a heterogeneous nuclear reactor whereby the heated moderator is flashed to steam in a separate chamber, and the steam so produced passed through a plurality of highly neutron-absorbent tubes, thereby superheating the steam. C. G. von Fredersdorff

Shor, A. J., Ward, H. T., Miller, D. and Rodger, W. A. RADIOACTIVE CARRY-OVER FROM BORAX-III AND TEST SYSTEMS. *Nuclear Science Eng. 2*, 126-42 (1957) April.

Data on steam from boiling-water, laboratory-scale nuclear reactors indicate that the radioactivity in the steam or condensate is less than the average radioactivity of the reactor water by a factor of 10^{-4} to 10^{-6}, depending on power density or steam velocity. This represents an effective large decontamination factor. Radioactivity is induced in the reactor water via neutron absorption by oxygen, nitrogen, chlorine and other minor impurities.
C. G. von Fredersdorff

DESIGN OF FIRST FAST BREEDER. *Nucleonics 15*, 68-72 (1957) April.

The Enrico Fermi Fast Breeder Reactor is designed to generate 90,000 KW electrical power at an overall thermal efficiency of 30%, and will be fueled with 27% enriched uranium for plutonium production at a breeding ratio of 1.20. Heat transfer for steam generation at 755° F. and 600 psig is achieved by primary and secondary sodium coolant circuits. Principal components of the reactor consist of the core and breeder blanket measuring 80 in. dia. and 70 in. high, thermal shield of steel, and control rods loaded with boron. Detailed diagrams and specifications of other components are included. C. G. von Fredersdorff

Reactor Design

Daniels, J. (assigned to Koppers Co.) INTRODUCTION AND REMOVAL OF GRANULAR SOLID MATERIALS INTO OR FROM CLOSED CHAMBERS AT INCREASED PRESSURE. U.S. 2,788,133 (1957) April 9.

This apparatus is used for discharging hot graular solids from a vessel at high gas pressure to a lower-pressure vessel with no passage of the gas. E. J. Pyrcioch

Goodwin, R. D. HIGH PRESSURE GAS-HANDLING EQUIPMENT FOR AUTOCLAVES IN CHEMICAL RESEARCH. *Ind. Eng. Chem. 49*, 861-64 (1957) May.

Equipment and procedures are described for handling gases as required in medium to high pressure laboratory chemical research. Provision is made for mixing gases, boosting the pressure, and measuring the rate of consumption while maintaining constant autoclave pressure. Such equipment increases the versatility and research productivity of an autoclave installation. Author's Abstract

Levitz, N. M., Petkus, E. J., Katz, H. M. and Jonke, A. A. A FLUIDIZED-BED PROCESS FOR THE PRODUCTION OF URANIUM TETRAFLUORIDE. *Chem. Eng. Progress 53*, 199-202 (1957) April.

Production of uranium tetrafluoride is an important step in producing uranium from ore or from spent nuclear fuel. The tetrafluoride is obtained by hydrofluoration of uranium dioxide. Both the reduction and fluorination steps were studied in single-stage, batch fluidized reactors. Continuous multistage hydrofluorination was also studied. Under equivalent temperature conditions only half the residence time for the solids was required in the three-stage as in the one-stage unit. The unit was a 3-in. diam. pipe, each stage 10 in. high. To study seal-up problems, a 4-stage, 5-in. diam. reduction reactor, and a 5-stage, 6-in. diam. hydrofluorinator above the reactor are under construction. C. L. Tsaros

Snyder, J. R., Hagerty, P. F. and Molstad, M. C. OPERATION AND PERFORMANCE OF BENCH-SCALE REACTORS. *Ind. Eng. Chem. 49*, 689-95 (1957) April.

Results for four different types of bench reactors—Parr shaker, rocking reactor, dashing impeller (Magne-Dash) and rotating impeller —were compared for two chemical reactions which were controlled by mass transfer rather than rate of reaction. The dashing impeller was found to have definite advantages; high rate of gas absorption and high useful volume were noted. E. B. Shultz

11. PROCESS EQUIPMENT AND INSTRUMENTATION

Centrifugal Cleaning

Williams, R. W. and Mesaros, J. CENTRIFUGE MEANS BETTER MUD, FASTER HOLE, LESS LABOR, LOWER COSTS. *Oil and Gas J. 55,* 124-31 (1957) May 6.

The centrifuge has operated on weighted Gulf Coast muds since 1953 in salvaging barite and rejecting harmful native solids. It is reducing additions of water and chemicals, eliminating contaminants, and producing effective packer muds. Authors' Abstract

Computers

Dagnall, B. D. and Mayers, P. THE APPLICATION OF A COMPUTER TO REFINERY PROBLEMS. *J. Inst. Petr.* (British) *43,* 115-18 (1957) April.

Two types of computer applications are discussed and presented as actual examples. The first is the calculation of optimum operating conditions with respect to feed rate, temperature and catalyst activity. The second, a management study, is a simulation of proposed operation of new equipment. Programming of the computer is well-discussed in the first example. P. B. Tarman

Landau, H. G. A SIMPLE PROCEDURE FOR IMPROVED ACCURACY IN THE RESISTOR-NETWORK SOLUTION OF LAPLACE'S AND POISSON'S EQUATION. Amer. Soc. Mech. Eng. Paper No. 56-A-13 (1956) Nov. 25.

The necessity for practical solutions of Laplace's and Poisson's equations arises in engineering. These equations can be solved by resistor networks. It is shown that in solving the equation $(\mathrm{Div})^2 u = f(x, y)$ by a resistor network, it is possible to reduce greatly the truncation error by simply adding additional resistors to the usual arrangement without any increase in the number of mesh points. G. Kunst

Reidel, J. C. AUTOMATIC RATING OF FRACTIONATORS. *Oil Gas J. 55,* 103-08 (1957) May 6.

A practical program is outlined for a plate-to-plate computation on a medium-speed computer. Humble Oil and Refining Co. has used this program on the naphtha fractionation and rerun facilities of the cat reformer. A modification was used by the Cosden Petroleum Corp. for an ethyl benzene separation project. G. Kunst

Viswanathan, R. V. SOLUTION OF POISSON'S EQUATION BY RELAXATION METHOD—NORMAL GRADIENT SPECIFIED ON CURVED BOUNDARIES. *Math. Tables and Computation 11,* 67-78 (1957) April.

In the application of the relaxation technique to the solution of the Poisson's equation, difficulty has been experienced in finding a difference approximation to the Poisson's equation at nodes at curved boundary. In this article results will be found adequate for tackling any type of curved boundary in two dimensions. Author's Abstract

COMPUTERS AND ENGINEERING DESIGN. *Chem. Eng. Progress 53,* 92, 94, 96, 98 (1957) April.

The experience of the Kellogg and Blaw-Knox Companies with computers is described. Kellogg has solved problems involving fractionation calculations, stress and flexibility calculations in piping systems, heat exchange equipment, furnaces, overall heat and material balances. Blaw-Knox has worked largely with piping systems. Specialized training is necessary for one to become an expert programmer. Any group working with computers should include mathematicians. C. L. Tsaros

LP Bulk Storage

Turner, C. C. TOMORROW'S BULK PLANT —TODAY? *LP-Gas 17,* 67-73 (1957) May.

A comprehensive list of suggestions for building safety, efficiency and economy of operations into present or new plants is presented. C. E. Pierson

Tank Cleaning

West, L. E. and Canady, B. L. CHEMICAL CLEANING OF STORAGE TANKS. *Petrol. Eng. 29,* C16-C19 (1957) May.

Chemical solvents are widely used to remove sludge and deposits from refinery storage tanks. Such solvents are applied through specially designed tools that make rapid and efficient cleaning possible. G. Kunst

Valves

Ebdon, J. F. A CENTURY OF SERVICE. *Gas 33*, 63-71 (1957) April.

A brief history of the Mueller Company and the development of its products. G. G. Wilson

Matthews, R. B. (assigned to Milwaukee Gas Specialty Company) CONTROL DEVICE FOR FLUID FUEL BURNING APPARATUS AND THE LIKE. U.S. 2,791,394 (1957) May 7.

Murphy, F. W. and Murphy, A. C. GAS SHUT OFF VALVE. U.S. 2,791,393 (1957) May 7.

Prescott, N. F. (assigned to Atwood and Morrill Co.) PLUG VALVE. U.S. 2,791,395 (1957) May 7.

12. MATERIALS OF CONSTRUCTION, AND CORROSION

Alloys

Cauchois, L., Didier, J. and Herzog, E. A SPECIAL N-80 STEEL TUBING DEVELOPED IN FRANCE TO RESIST SULFIDE STRESS CORROSION IN SOUR GAS WELLS. *Corrosion 13*, 263t-69t (1957) April.

Data on physical properties and resistance to hydrogen sulfide corrosion of a new type of steel are presented. This steel was developed in France for use in gas wells containing up to 15% H_2S. G. G. Wilson

Carr, E. J. TITANIUM ALLOY SUITED FOR STRETCH-FORMED PARTS. *Materials & Methods 45*, 140, 41 (1957) April.

Preliminary tests indicate six aluminum—four percent vanadium alloy can be formed with standard tools and techniques.

Author's Abstract

Underwood, E. E. CREEP PROPERTIES FROM SHORT TIME TESTS. *Materials & Methods 45*, 127-29 (1957) April.

Curves are given to determine both the ultimate tensile strength and the creep rupture stress at a particular temperature from knowledge of the hot hardness of an alloy.

H. L. Feldkirchner

White, H. S. MATERIALS FOR SMALL, OIL-FREE BEARINGS. *Materials & Methods 45*, 135-39 (1957) April.

Data on wear rates and friction coefficients of many combinations of metallic and nonmetallic materials. Author's Abstract

Wilson, R. M. Jr. and Burchfield, W. F. NICKEL ALLOYS SHINE AT HIGH TEMPERATURES. *Chem. Eng. 64*, 298-306 (1957) May.

Recent high temperature data on the mechanical properties of Ni and Ni alloys is useful in design. W. G. Bair

IMPROVED NICKEL ALLOY SHEET CAN BE USED UP TO 1600° F. *Materials & Methods 45*, 173 (1957) April.

A new alloy developed by International Nickel Comp. Incoloy T, which differs from the conventional Incoloy in its one percent titanium content, shows improved tensile and rupture properties and good oxidation resistance up to 1600°-1700°F. H. L. Feldkirchner

Cathodic Protection

Chen, K. A. CATHODIC PROTECTION FOR MODERN GAS SERVICE. *Gas Age 119*, 42, 44, 45 (1957) April 4.

New developments are given in the use of cast iron, bare steel, coated steel and copper inserts for protected service installations. E. B. Shultz

Hubbard, A. W. THE TANKER AND CATHODIC PROTECTION. *World Petroleum 28*, 46, 47 (1957) April.

Internal protection of tanker cargo-ballast compartments, which has been found highly successful, is now being supplemented by external application of sacrificial anodes which keep hulls virtually corrosion-free. Savings have been attained in dry-docking and paint costs and fuel consumption is reduced by maintenance of an unpitted hull. G. Kunst

Searcy, J. E. Jr. MODERN GROUND-BED DESIGN SAVES MONEY. *Pipe Line Ind. 6*, 24-27 (1957) March.

Money spent initially for careful design and engineering saves more in power costs and total investment throughout the life of the system. This up-to-date chart and nomograph makes accurate calculations quickly.

Author's Abstract

Coatings

Cummings, J. D. (assigned to Crutcher-Rolfs-Cummings, Inc.) PIPE INTERNAL COAT-

ING MACHINE. U.S. 2,792,807 (1957) May 21.

This patent covers a machine to internally clean and coat large diameter pipe, as well as auxiliary pipe-handling equipment. The machine consists of a track-mounted, power-driven cleaning and coating head which can be moved entirely through a section of pipe.

G. G. Wilson

Duligal, E. A. PROTECTIVE COATINGS IN INDUSTRY—REVIEW OF MODERN SYNTHETIC MATERIALS. *Corrosion Tech.* (British) *4*, 198-200 (1957) June.

A brief review of modern synthetic coating materials. G. G. Wilson

Edwards, C. R. and Jenkins, E. CORROSION RESEARCH LABORATORIES — 12 — MINISTRY OF SUPPLY OUTDOOR EXPOSURE STATION, GLASCOED, WALES. TESTING PAINTS BY OUTSIDE EXPOSURE: PART I. *Corrosion Tech.* (British) *4*, 192-94 (1957) June.

The first part of a two-part article twelfth in a series on corrosion research laboratories. The article briefly describes the layout and test facilities of the British Ministry of Supply outdoor exposure station at Glascoed, Wales.

G. G. Wilson

Glass, D. AN ECONOMIC STUDY OF UNDERGROUND CORROSION PREVENTIVE MEASURES. *Petroleum Eng. 29*, D33-D40 (1957) April.

This is a study of economic principles as applied to underground corrosion preventive measures. It also includes results of a survey of 28 leading pipeline companies with respect to cost of coating materials and application.

G. Kunst

Helms, F. P. HOW TO MAKE STEEL LAST LONGER: ZINC COATINGS, COMPLETE CORROSION PROTECTION AT LOWEST OVER-ALL COST. *Oil Gas J. 55*, 106-09 (1957) April 8.

Modern methods of zinc coating provide a cheap means for making steel last longer. The benefits of galvanic action of inorganic zinc coatings are used by applying it as a base or primer for organic coatings. G. Kunst

Ingham, H. S. SPRAYED METAL AS A BASE FOR PAINTS. *Corrosion 13*, 252t-56t (1957) April.

Thin metallized coatings of zinc and aluminum as used on steel is discussed in detail. Recommendations are made regarding surface preparation. Effects of metal coatings on application, appearance and performance of the paints applied over them are treated. Paint failures are discussed with attention to underground power plant applications. Paints and primers for a given sprayed metal and the use of thinners are discussed briefly. Author's Abstract

A SURVEY OF CHROMATE TREATMENTS. *Ind. Finishing* (British) *9*, 561-68 (1957) May.

Chromate treatments have become widely used not only because they fill a need for corrosion-resistant finishes but also because they are inexpensive and simple to apply. G. Kunst

OXIDE LAYERS ON IRON. *Ind. Finishing* (British) *9*, 570-72 (1957) May.

An investigation of the applicability of oxide layers on iron as a protection against corrosion and as an adhesive undercoat for subsequent coating is described here. G. Kunst

Corrosion Causes

Bradley, B. W. and Dunne, N. R. CORROSION MEASUREMENTS IN A HYDROGEN SULFIDE-WATER ABSORPTION PILOT PLANT. *Corrosion 13*, 238t-42t (1957) April.

The results of corrosion tests conducted in a hydrogen sulfide-water absorption pilot plant are presented. Tests included coupon tests of carbon steel and a number of alloys, stress corrosion cracking tests of a number of alloys, and tests of an amine-type water dispersable inhibitor. G. G. Wilson

Holland, C. J. Jr. and Tanzola, W. A. A CASE HISTORY IN COOLING WATER TREATMENT. *Corrosion 13*, 257t-62t (1957) April.

The use of mineral acid feed to control water pH and a mixture of phosphate and chromate inhibitors to control corrosion in an open-type recirculatory water system is described.

G. G. Wilson

Schaschl, E. and Marsh, G. A. THE EFFECT OF DISSOLVED OXYGEN ON CORROSION OF STEEL AND ON CURRENT REQUIRED

FOR CATHODIC PROTECTION. *Corrosion 13,* 243t-51t (1957) April.

The interrelationship of corrosion rate of steel, dissolved oxygen concentration, agitation, electrode potential, and cathodic protection current density were studied under controlled laboratory conditions. This work was based on the use of steel corrosion probes described in previous papers. G. G. Wilson

Inhibitors

Carls, W. H. Jr. COOLING-SYSTEM COSTS CUT BY CORROSION AND SCALE PREVENTION. *Petrol. Eng. 29,* D52-D56 (1957) May.

Impaired efficiency and eventual costly repairs and replacements are avoided by the use of proper water conditioning chemicals. Combined corrosion inhibitors and scale preventives give best results. G. Kunst

Iron Powder Techniques

Doelker, W. J. WHAT YOU SHOULD KNOW ABOUT CARBURIZED IRON POWDER PARTS. *Materials & Methods 45,* 122-26 (1957) April.

You can strengthen iron powder parts by adding carbon, but there is more than one method. The method you choose will have an important effect on the properties of the finished part.

Author's Abstract

Pipeline Steels

Wilder, A. B. and Aebersold, A. F. PIPELINE STEELS. *Mech. Eng. 79,* 448-53 (1957) May.

A description of the new steels and processes in use on manufacture of large diameter pipelines. W. G. Bair

13. NEW BOOKS

Air Pollution

Riesz, C. H., Morritz, F. L. and Franson, K. D. CATALYTIC DECOMPOSITION OF NITRIC OXIDE. Air Pollution Foundation Report No. 20 (1957) May.

A rapid-screening method was found to evaluate the feasibility of decomposing NO at conditions practical for automotive exhaust application. None of the catalysts tested appeared to be sufficiently active. However in the work, an alternative procedure utilizing active carbon was disclosed. Further development may make this feasible. Authors' Abstract

Engineering Mathematics

Allen, D. N. De G. RELAXATION METHODS. New York: McGraw-Hill Book Co., Inc. (1954).

This is a "how to" book on the use of relaxation methods to solve engineering problems. The basic method and several variations are introduced by using them to solve simple systems of simultaneous linear algebraic equations. The origins of the method and of the term relaxation are then illustrated from considerations of the solution of simple framework problems. The rest of the book is devoted mostly to various common differential equations including the La Place, Poisson, and the biharmonic and nonelliptic equations. In final chapters such topics as the solution of eigenvalue problems with both algebraic and differential equations, the solution of problems involving internal boundaries and interfaces, and three-dimensional relaxation are considered. Some relationships particularly useful in relaxation calculations are summarized in four appendices including standard cases of beam deflection and other finite-difference approximations. The presentation is largely built around the solution of sample problems, and unworked problems also are presented at the end of each chapter. A relatively complete bibliography on relaxation methods is included. G. G. Wilson

Hot-Water Corrosion

Lancaster, C. J. CORROSION PROPERTIES OF VARIOUS MATERIALS IN HIGH TEMPERATURE WATERS. U. S. Dep. Comm. PB 121503 (Reprint of E.E.S. Report 040028B-22 June 1953).

Results are presented for a number of experiments that relate to the behavior of selected alloys in high temperature waters. Descriptions of the tests follow: a) static test of stressed and unstressed Types 347 and 310 stainless steel in 500° F. distilled water with 300 ppm NaCl added, b) static test of stressed and unstressed Types 347 and 304 stainless steel in 500° F. boiler feedwater with various concentrations of constituents, c) dynamic loop test of several alloys at 10 ft/sec in 500° F. water containing from 1 to 3 ml/l oxygen, d) dynamic autoclave test of various prestressed alloys in 550° F. natural sea water at 10 ft/sec.

Author's Abstract

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Industrial and Engineering Chemistry
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